

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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The Hudson River Tunnel.

After numerous and vexatious delays during the last few years, owing to litigation and other causes, the great project of tunneling the Hudson River is being energetically and rapidly pushed forward. We

necessity, for safety sake, of keeping the crown of the tunnel at least 20 feet below the river bed, and the considerable depth of the Hudson, 60 feet at some points, have called for quite a considerable grade of the tunnel. For a distance of approximately 2400 feet from the New Jersey shore line, the grade is 2 feet per 100 feet, then it falls to 6 inches, and when approaching the New York side rises to 3 feet. The approaches on both sides will be made probably at an easy grade. It was at first proposed to make one large double-track tunnel, but this plan has been now abandoned, and two single-track tunnels are to be built. Experience at Detroit and at other places where subaqueous tunnels have been built, has taught that while the latter plan offers many valuable advantages, the cost of construction is not materially, if at all, enhanced. One of the pair is now being actively pushed forward, while it is expected that the

on the New Jersey side. A shaft located 83 feet from the shore line, and protected by a bulkhead, as shown in Fig. 1, was first sunk to a depth of 60 feet; its sump, which goes a little deeper than the tunnel line, just entering the layer of sand. The inside diameter of the shaft is 30 feet. It was sunk in the usual manner, and is lined with masonry, in cement, which tapers from 4 feet at the bottom to 2½ feet at the top. It is guarded against an influx of water from below by an arched layer of cement 2 feet 6 inches in thickness at the center and from 3 to 3 feet 9 inches at the sides. In the center rises a 12-inch stand pipe which performs some important functions. While it is directly used for furnishing the supply of water in the tunnel for mixing the cement and working the silt, the pumping of water from the stand pipe has the effect, at the same time, to relieve the pressure on the bottom of the shaft and also at the bottom of the temporary work, until the final con-

foundations for bridges, &c. It has never until now been used for subaqueous tunneling, for which purpose, judging from the admirable results obtained until now, it will conquer a leading place. It is of course impossible to predict at the present juncture how well it will be able to meet with the aid of compressed air the difficulties presented by more dangerous ground, like quicksand or other strata permeated by water under greater head. As we have already stated, the material through which the Hudson River Tunnel is now passing is, fortunately for that enterprise, by no means of a character to tax the system adopted in a severe degree, but there is every reason to believe that with its aid the present tunnel can be built at an expense considerably below that generally accepted as a minimum for such an undertaking. While the column of compressed air thus virtually takes the place of the cumbersome and inconvenient shields or other contrivances in securing the

astonishing in this concentration of work to those who have had occasion to watch the long distances intervening between the different stages of work in the different sections of an ordinary tunnel.

Concerning the details of the work, the following data, for which we are chiefly indebted to Messrs. Brush and Andersen, may prove of interest. At about one-half the depth of the shaft is an air-lock made of boiler iron 6 feet in diameter by 15 feet in length, and provided with heavy gates at either end, which can be hermetically closed. This air-lock forms the ordinary ante-chamber necessary to effect communication between the outer air and the tunnel. Passing through the air-lock, a temporary entrance, shown in Fig. 1, leads to the tunnel proper. The compressed air is furnished at present by a Clayton compressor having 10-inch steam cylinders and 10-inch air cylinders, with a 13-inch stroke, a second compressor of very recent construction being

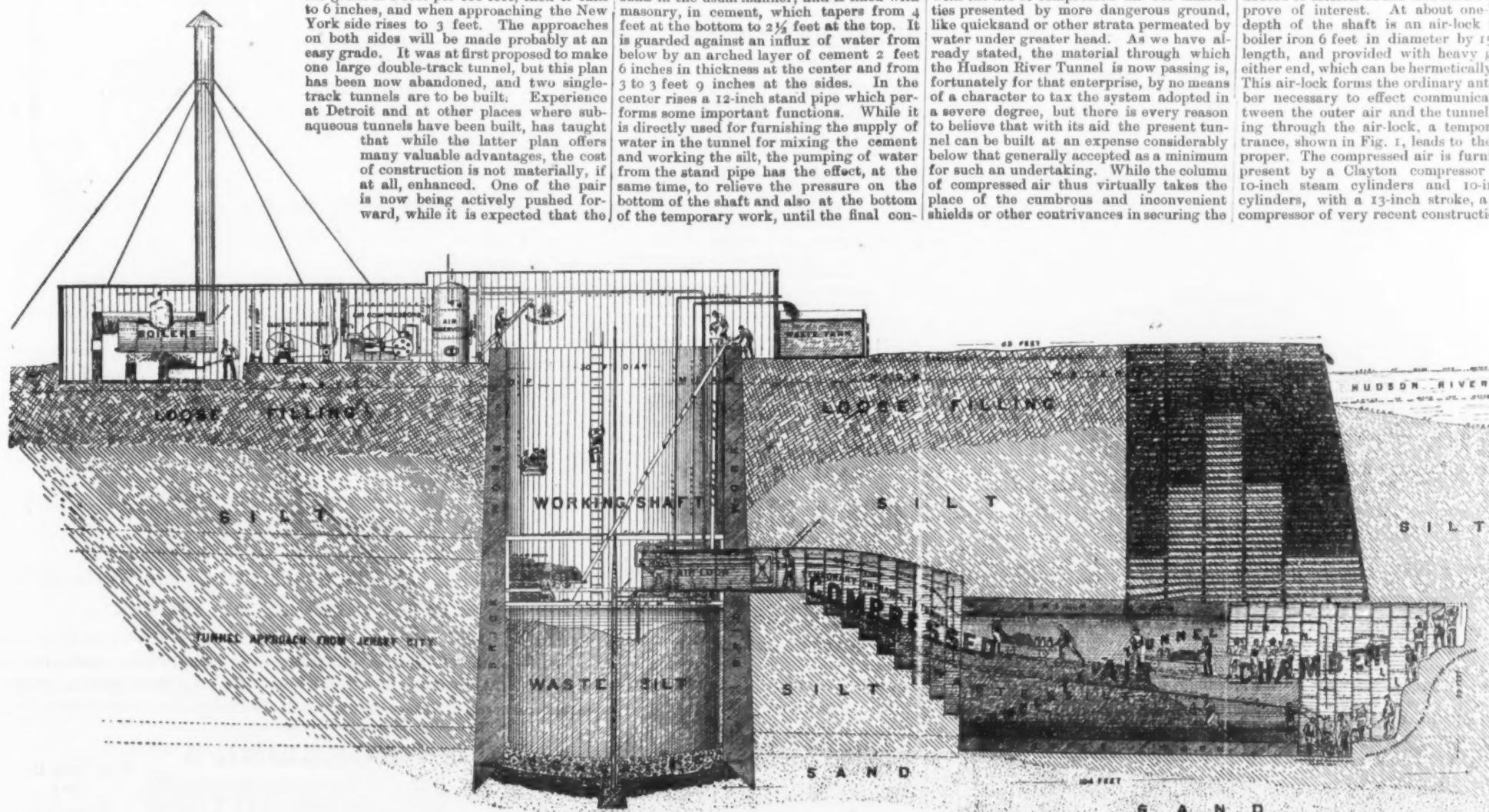


Fig. 1.—Section of the Workings of the Hudson River Tunnel.

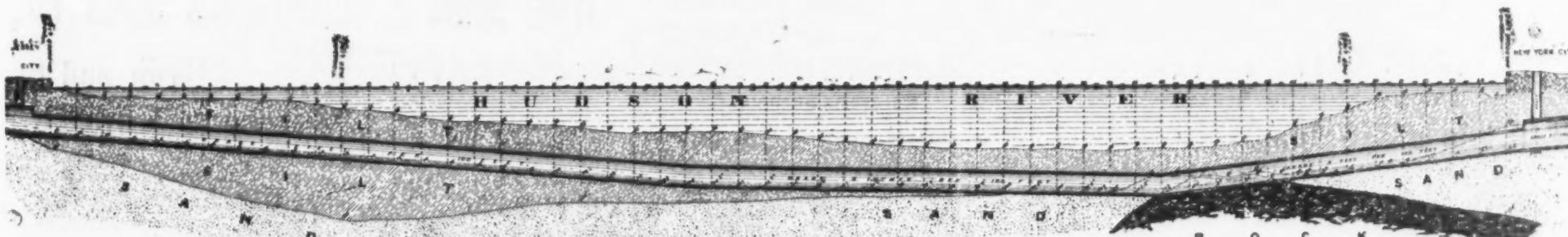
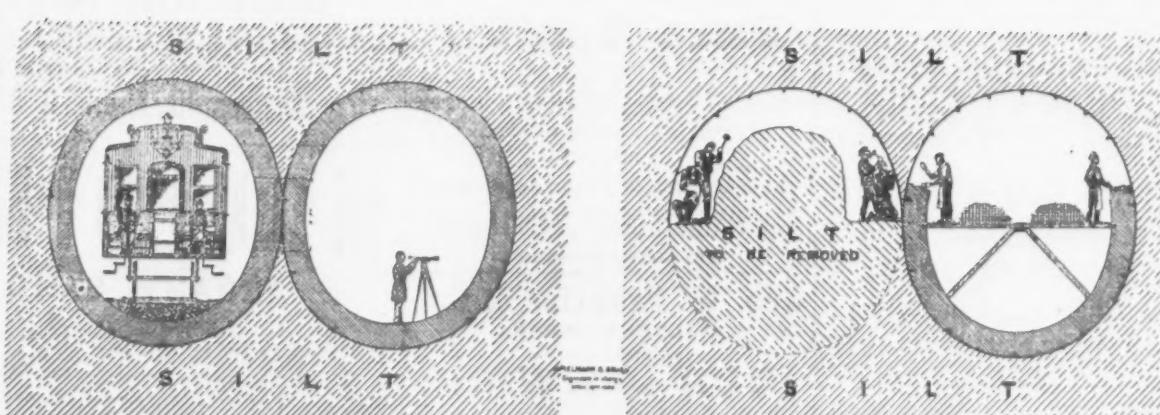


Fig. 2.—Profile of the Hudson River Tunnel, April 12, 1880.

have from time to time followed its progress, and propose now to give a more detailed description, chiefly of the technical features, which, on account of originality and simplicity, are of great interest and reflect credit upon the president and active manager of the company, Mr. D. C. Haskins, of California; the engineers in charge, Messrs. Spielman & Brush, of the University of the City of New York, and the superintendent of the work, Mr. J. F. Anderson, of Sweden, to whom we are indebted for much information and the accompanying illustrations.

The difficulties, inconvenience and expense attending the present method of transferring to New York the freight and passengers from the depots of the great railways, the Pennsylvania, New Jersey Central, New York, Lake Erie and Western and Delaware, Lackawanna and Western are sufficiently appreciated by all who have visited New York to render any comment as to the importance of the new enterprise unnecessary.

The width of the Hudson River on the line of the tunnel, from the foot of Fifteenth street, Jersey city, to Leroy street, New York, is 5500 feet. Fig. 2, which gives a profile of the tunnel, clearly shows the depth of the river as found by recent very careful soundings. These revealed accurately the nature of the ground to be passed through. It will be noticed that fully 3600 feet of the whole length of the tunnel proper passes through what is called "silt," a grayish clay which is comparatively favorable to the safe progress of the tunnel. The sand, which was grazed at the beginning of the work on the New Jersey shore, comes up again near the New York line, and, for a short section of 400 feet, rock enters the floor of the tunnel as at present projected. The



Figs. 3 and 4.—Section of the Hudson River Tunnel.

THE HUDSON RIVER TUNNEL.

second will be commenced at an early date. We may mention that under both shores the double tunnels are united in one, so that as far as the approaches are concerned there will be one large double-track tunnel.

Each of the two tunnels under the river will be very nearly round, having a clear height of about 18 feet and a width of 16 feet. We need hardly point out that this circular form presenting valuable advantages so far as lining is concerned, adds greatly also to the stability of the structure. As yet work has been done only

connection is made between the shaft and the tunnel.

The most interesting and important novelty connected with the construction of the tunnel is the method adopted for excavating and removing the material. Compressed air is used to counteract the water pressure and render the face of the work so dry and so firm that no supports are necessary to retain it. In itself the use of compressed air for this purpose is quite old, having been used for many years to sink shafts through quicksand, and to make

tunnel face, it also performs an important function in serving to convey the material excavated out of the tunnel, the silt being forced out, mixed with water, in the shape of a pulp through a pipe. The free face allows the tunnel lining to follow it closely, and thus exposes to accident only that small section which is actually under course of construction. The tunnel advances with its full section, and beyond a few occasional props to hold the first segments of the iron casing in position, no preliminary timbering or support is necessary. There is something

in reserve. The pressure used generally ranges from 17 to 20 pounds per square inch, which is comparatively low. The air first enters a receiver, and then passes through the supply pipe to the air-lock, and thence into the tunnel.

The face of the tunnel is terraced in the ordinary way in excavating earthwork, and the material, which is dug out at the present time by hand, is thrown to the lower part of the tunnel, whence it is forced in a pulpy state through a pipe to the working shaft, the lower portion of which acts as a receiver for the silt. Approximately the amount of water which is pumped out of the stand pipe for use in rendering the silt pulpy enough to flow through the discharge pipe is one-quarter cubic foot per cubic foot of silt. From the shaft the silt is conveyed at present by a No. 5 Deane pump (4½-inch water cylinder, 7-inch steam cylinder, 10-inch stroke) standing on the air-lock platform to the waste tank, from which it is removed from time to time. The excavation and conveyance of the silt, it will be noticed, is a very simple matter, which is much favored by the fact that no bowlders or gravel are ever met. The upper part of the face is kept a few feet ahead, and enough is dug out to make room for the first upper section of a ring of the iron shell weighing about 1500 pounds per running foot. The aim is to keep close up to and ahead of the working face with this shell, completing it all around as early as possible. The sections of this shell are flanged ¾-inch plates, 2 feet 6 inches wide and either 3 or 6 feet long. They are bolted together by their 2½-inch flanges, and are put up in such a way that there are no continuous longitudinal joints. This is at once followed by the masonry, generally in two sections, the more advanced being carried to about one-half the height.

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and the second completing it. The wall is 2 feet thick, of which 1 foot is kept ahead of the other for some distance. The centers are made of light sheet-iron frames, the brick is hard burnt and the cement used is "Norton," mixed with 1 1/2 parts of sand. Both brick and cement are conveyed down to the platform level in the working shaft by being dumped into simple shutes. Work in the tunnel goes on day and night, there being three eight-hour shifts. At present the rate of advance is about 4 feet per day of 24 hours, but it is expected that the progress will be more rapid in the future. At the time when our illustration was prepared the advance of the works was 104 feet; on the 15th instant the tunnel was 204 feet from the shaft, and by the time that our description has come to the hands of our readers 225 feet will probably be excavated. The electric light is used, both in the tunnel and above ground, the necessary machinery being provided and placed as shown in Fig. 1.

In conclusion, we may state that, judging from the energy with which work is now being driven by the Hudson River Tunnel Company under the active management of D. C. Haskin, its president, there is every likelihood that this, the greatest enterprise of its kind in the world, will be carried to a successful issue.

American Honors at the Australian Exhibition.

Advices from Sydney, N. S. W., under date of March 29 are as follows: The International Exhibition here has received a prolonged lease of existence, owing to the fact that the Melbourne commissioners decline to receive exhibits for their fair until about July, and as the judges had not quite completed their awards it was decided to keep the show open until the 20th prox. The past month has been more exciting to exhibitors and their agents than any corresponding period since they arrived here. All are anxious to secure favorable awards and learn what the jurors thought of their exhibits. Great complaints have been made regarding the incompetency of the judges, and justly so in some cases. Perhaps the keenest competition in connection with this "International" has been in the department of horology. England, France, Switzerland and Australia being represented by all their greatest makers, the United States by the Waltham Company only, and in some degree the latter have to thank Mr. Mansen, their representative here, for the results they have obtained. The Royal Astronomer was fixed upon as the most fitting person to make the crucial tests, and he has finished an exhaustive report illustrated by diagrams. The press of this city has not yet had access to the report courteously supplied to your representative. One paragraph is specially interesting as a high compliment to American enterprise and ingenuity. Speaking of the Waltham watches it says: "In consideration of the fact developed in this examination and the preponderance of elements of inherent and comparative merit (each in independent judgment) being nearly equal to 7 per cent. more than the next highest exhibit, we have found it exceedingly difficult to make such a classification to all. We adjudge the American Watch Company, of Waltham, Mass., U. S. A., a first-class award, and such other special distinction, diploma, medal or award as is consistent with the duties and obligations of the honorable Sydney International Commission for the largest and most complete exhibit of the horological instruments examined."

AMERICAN HONORS.

The awards to citizens of the United States this month are as follows:

Printing Machinery.—Mackellar, Smith & Jordan—1st order of merit; W. W. Page & Co.—1st; R. Hoe & Co.—1st; Fairbank & Co.—1st; Golding & Co., Boston—3d; R. Hoe & Co.—4th.

Jewelry.—Aitken & Lambert, New York—1st; Purdy, Huntingdon & Co.—2d.

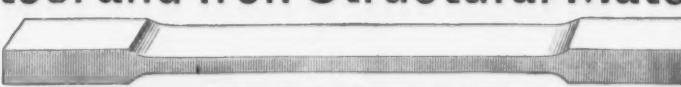
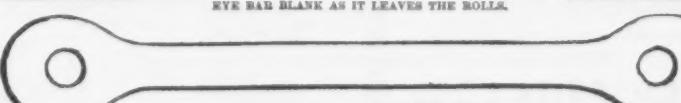
Miscellaneous.—H. W. Johns' Mfg. Co., New York, asbestos roof coating, cement, felting, &c.—2d; Morrisson & Hutchinson, New York, linen shirts—2d; Brinkerhoff, Turner & Co., New York, cotton duck, sail twine, &c.—2d; E. W. Holbrook, New York, sheetings, ducks, &c.—4th; Wamsutter Mills Co., Mass., calicoes, sheetings, &c.—1st; Y. Seymour, Scott & Bros., Philadelphia, papetone—2d; Thos. Potter, Sons & Co., Philadelphia, oilcloth—1st; G. W. Blaben, Philadelphia, oilcloth—1st; Ithaca Calendar Clock Co., Ithaca, N. Y., clocks, &c.—2d; Ansonia Clock Co., Ansonia, Conn., clocks, &c.—2d; Seth Thomas Co., Bristol, Conn., clocks—2d; Waterbury Clock Co., Waterbury, Conn., clocks—2d; Howe Scale Co., Rutland, Vt., scales—1st; Fairbanks & Co., London and New York, scales—1st and special distinction; Silver Lake Co., Boston, cotton sash cord and check lines, &c.—1st; L. Waterbury, Brooklyn, N. Y., manila and hemp cordage—1st; Winchester Repeating Arms Co., New Haven, Conn., rifles, muskets, carbines, and cartridges—special 1st and special distinction; C. Mornington & Co., New York, corn flour—1st; corn starch—2d; T. Kingsford & Co., New York, corn flour—2d; corn starch, 1st; Portland Packing Co., Portland, corn and blueberries—1st; J. G. Kraft & Co., Baltimore, tinned fruits and tomatoes—1st; H. K. & F. B. Thurber, New York, canned fruits and vegetables—1st; syrups and honey—1st; H. K. & F. B. Thurber, oatmeal (prepared)—1st; Abbott, Downing & Co., Concord, N. H., single-headed buggy—1st; Abbott, Downing & Co., box buggy, hoodless—2d; Hooper & Co., New Haven, Conn., box buggy, hoodless—1st; Dole & Osgood, Boston, Mass., light wagons—1st; Abbott, Downing & Co., wagonette—1st; Cortland Wagon Co., New York city, 2 express wagonettes—1st; Cortland Wagon Co., 2 light farm wagons—2d; Dole & Osgood, 2 light farm wagons—1st; Abbott, Downing Co., 2 pairs of light carriage wheels—1st; Steidbaker Bros., South Bend, Ind., farm wagon—4th; P. Adams, heavy draft express wagon—1st; Abbott, Downing Co., no top box buggy—2d; Kooker & Co., New Haven, no top box buggy—1st, special merit; W. D. Milson & Co., New York, perambulators—1st; J. R. Hill, Concord, N. H., carriage harness and saddlery, wagon harness, buggy harness—1st, special degree.

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The Black Hills Country.

The railroads now approaching the Black Hills seem likely to meet a more definite need of communication than has been the case with some of the Western roads, which have had to first settle the country up and make their own custom before they could get a paying traffic. But the gold discoveries in the Black Hills have brought to them a population such as nothing but gold discoveries could have brought to a spot so remote and difficult of access. There is at present a population of some 40,000 in three organized counties, in spite of the 300 miles that lie between the Hills and the nearest avenues of communication with the world. This 300 miles is equivalent, in time and cost, not to speak of hardships, to the 2000 miles between New York and the point at which the traveler to the Black Hills must leave the railroad. This 300-mile "insulating belt" is soon to be traversed by no less than three railroads, if present plans are carried out. How great a center of activity the country is likely to become with railroad communication, can be guessed from noticing what has been done even without such communication. The capital of the Hills—Deadwood—had a fire that destroyed \$2,000,000 worth of property, little insured; yet but one firm succumbed, and the whole was rebuilt with increased value within six months. There is one bank in Deadwood that does \$500,000 worth of business per month with New York. There are four daily newspapers, telegraphs, telephones, schools and churches. There is, besides, a great extent of rich farming and grazing lands in the neighborhood, and, as the first excitement of mining wears off, men turn to these and develop their capacities. Indeed, the considerable and rapidly growing population of the section renders it imperative that there should be agricultural produce to meet their demands, and therefore the farming land can no longer be allowed to lie idle. The gold product, on which all this sudden development depends, is now said to be fully \$5,000,000 per annum, and steadily increasing.

The French Cable.—The London Telegraph says: Anglo-American cable shares rallied Monday on further rumors of the new French cable having been cut in two by an iceberg. The stock-market idea is that, as the French company will be unable to raise funds for the cost of the recovery and repair of the cable, it will be sold to the Anglo-American Company on the latter's own terms.

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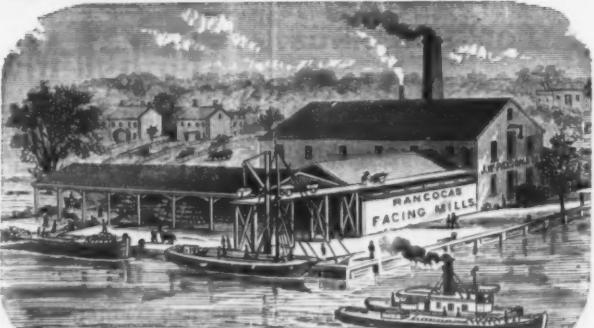
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The Proposed Bankrupt Law.

At the last meeting of the New York Chamber of Commerce a report was submitted from a special committee relating to the bankrupt bill now before Congress. It is an extremely interesting and valuable contribution to the discussion of this important question, and though it is not likely to have any immediate effect upon the passage of the measure, which can hardly be taken up at the present session, it ought to be carefully considered. The report, which was presented by Mr. D. C. Robbins, criticises with great particularity the measure prepared by Judge Lowell, of Massachusetts, approving many of its provisions, but suggesting radical changes in others. The point which will strike the general reader with greatest interest is the proposition of the committee of the chamber that "a discharge of the debtor should never be allowed without a careful examination of past transactions, by which recklessness and dishonesty may be punished and discouraged."

This is a perfectly sound proposition, and one which has been ignored to much too great an extent by those on whom the task of framing legislation has fallen. In the opinion of the Committee of the Chamber it has not received from the author of the Massachusetts measure the attention which it deserves. The committee say:

"In Great Britain a trial of the debtor for bankruptcy is regarded as essential. In 1860 the British act was so modified that a debtor might arrange a settlement with his creditors and avoid a trial for bankruptcy, but this amendment has not given satisfaction. A recent bill proposed by the Attorney-General in 1879 disposes of this provision, and insists that all cases of bankruptcy that may occur hereafter, as before 1860, shall receive public trial, without regard to any arrangement that may be made between the debtor and his creditors."

"In Judge Lowell's proposed bill all this is overlooked. A debtor may have made a fraudulent partnership, and may have conducted a reckless and fraudulent business for years, without responsibility to the public, provided that care be taken to keep within the requirements of the act, which are quite limited, for a period of three months preceding his adjudication as a bankrupt."

If this be a correct statement of the effect of the bill now before Congress, it cannot be neglected with safety. Nothing is more demoralizing to the whole business community than the possibility of a debtor receiving a legal discharge from indebtedness incurred with intention to defraud, or with a carelessness equivalent to dishonesty. This was the bane of the former bankrupt law. That law might fairly have been described as a legal contrivance for the encouragement of swindling. It was a terror to creditors and to honest debtors as well, but to the clever, unscrupulous sharpers who, unfortunately, infest every branch of trade, it was a welcome refuge when the time of settlement came. Its enormous costs and its expensive delays and great uncertainties, enabled a shifty swindler to hold it over the heads of his creditors as a club by means of which to force their consent to a settlement. Directly and indirectly, it is the opinion of those most familiar with its practical workings, that this law did far more harm than good.

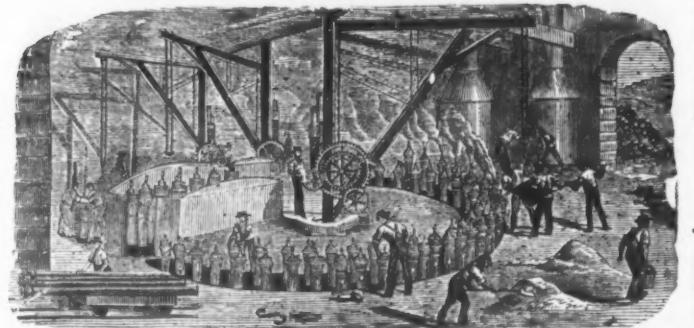
The experiment to which the Committee of the Chamber refers as having been made in England in the direction of greater indulgence to the debtor, has been a signal and disastrous failure. The amendments proposed at the last session of Parliament by the Attorney-General not only include the change mentioned by the Committee, but several others in the same spirit. For instance, the new bill provides that the right to an absolute discharge be refused where the creditors have not received and are not likely to receive (without any fault on the part of the trustee) at least 50 per cent. of their claims, or where the bankrupt, being a trader, has not kept proper books during the three years prior to his bankruptcy, or has increased his liabilities by carrying on trade while insolvent, or contracted debts without reasonable expectation of being able to pay them; or, not being a trader, has brought on his bankruptcy by reckless speculation or extravagant living. These are more stringent provisions than have ever been enforced in this country, or, for that matter, in Great Britain either, but they are not so severe as some of those which went into effect in Germany on the 1st of October last. In that country, if a bankrupt has gone considerably beyond his means, either by speculation or excess in personal expenditure, or if he has kept his books negligently, or omitted to draw up balance sheets at appointed intervals, he is liable to imprisonment for a term which may reach two years. It will be seen that these old-fashioned Germans actually regard the recklessness which robs another of his property as a crime, an idea which is quite foreign to American minds.

No business community can be made honest by law, but the standard of the law should, nevertheless, be that of the strictest honesty, and it should never throw its protection about those who do not conform to such a standard, even if it do not punish them for a departure from it. No one can deny that the tone of commercial dealings in this country is far below that of strict honesty. Men who "fail" from carelessness, extravagance, or even worse faults, do not suffer the positive disgrace which they ought to suffer. There is an unwarrantable tenderness for their faults, growing out of the consciousness among their associates, perhaps, that if every man got his deserts, too few of them would go unwhipped of justice. While this is so it would be idle to expect that very stringent laws would be rigidly observed. But such laws would have this advantage—that it would be to the interest of creditors to enforce them, and so gradually they might come to be enforced. In any case, the principle laid down by Mr. Robbins' Committee is an essential one—"that any law which may be devised will prove misfortune, unless account is taken of the responsibility of the debtor for the proper management of his business."—*New York Times*.



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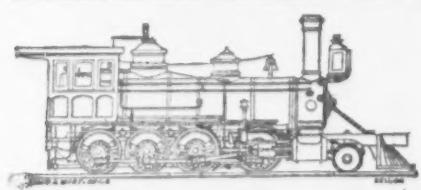
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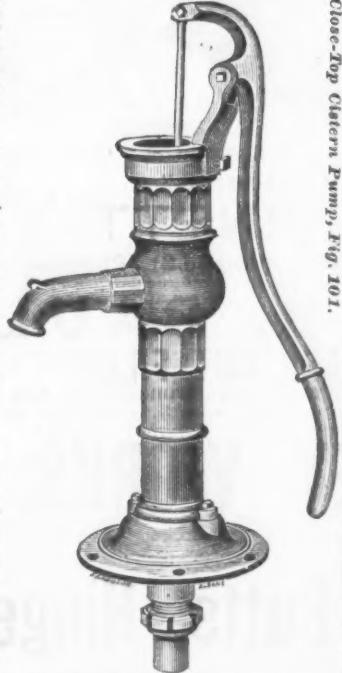
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7

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Fig. 70.

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Grindstone Frame. Fig. 145.



Fig. 268.

Pitcher Pump.
Fig. 120.

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Fig. 259.

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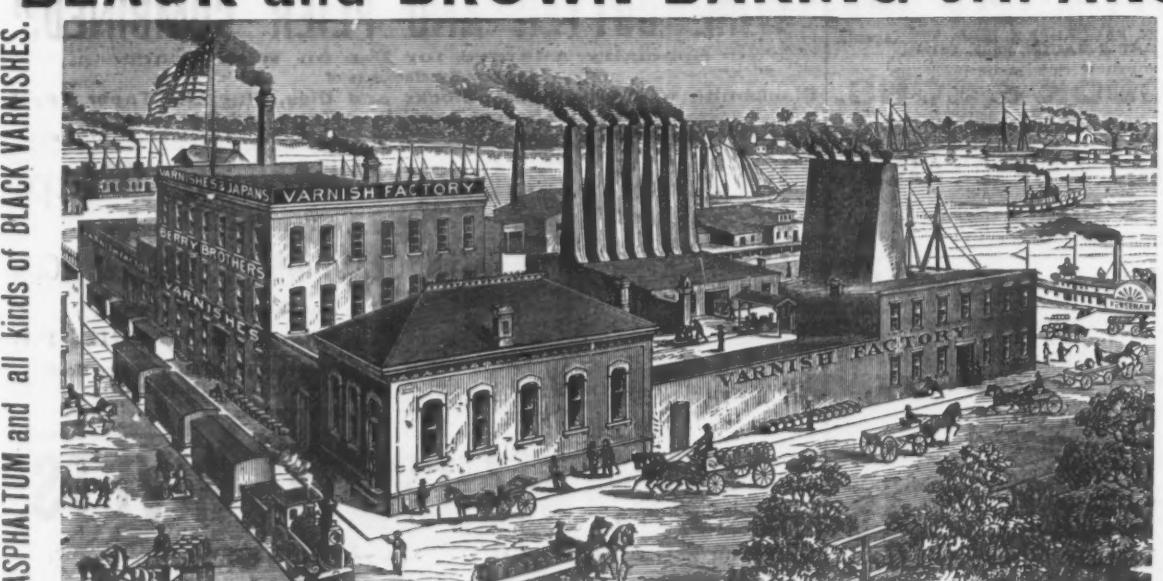
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1-inch bolt, button-head; length left through for riveting equal to $\frac{7}{16}$ inch diameter of bolt	31,282
$\frac{3}{4}$ -inch bolt, button-head; length left through for riveting equal to one-half diameter of bolt	35,812

We had occasion some time since to refer briefly to a series of very important experiments, made under the auspices of the Bureau of Steam Engineering by Chief Engineer James P. Sprague, U. S. N., and Passed Assistant Engineer G. E. Tower, U. S. N., the object of their inquiry being to "determine the value and resistance of screw stay-bolts for boilers under different conditions, using iron, steel and copper plates of different thicknesses." In making the tests, all plates of each material were made of the same bar. With a view to showing how important a factor is the rivet head and the manner in which it is formed, a series of experiments were made with the following results: Three trials each were first made with $\frac{1}{2}$ -inch iron plates and 1-inch iron stay-bolts, not riveted, and riveted over with the ordinary thin or low conical head. They were simply arranged so as to show the actual strength to resist pulling through the plate, the supports consisting of heavy plates, with a hole $1\frac{1}{4}$ inches in diameter, the boiler plate resting upon the heavy plate and the stay-bolt adjusted to the center of the hole, thus allowing the bolt to have a clear space around it equal to the overlapping of the riveted head on the boiler plate. The bolts not riveted

In making the experiments in screw stay-bolts and plates an apparatus was used so arranged as to represent a section of a firebox, hydraulic pressure being used to produce the strain.

This apparatus, which is shown in section in our illustrations and in elevation in Fig. 2, consists of a composition ring 4 inches deep, 18 inches internal and 23 inches external diameter, faced true on both sides, and having 31 holes for $\frac{1}{8}$ -inch through bolts; and on each side of the connecting pipe to the pump a hole was tapped for a bolt of the same diameter. These holes were laid off and drilled equidistant on a circle $20\frac{1}{2}$ inches in diameter. The bolts for securing the plates to the ring were of steel, turned and chased to fit $\frac{1}{8}$ -inch hexagonal

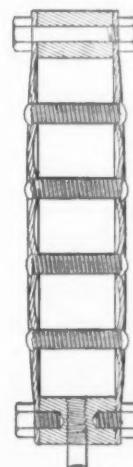


Fig. 1.

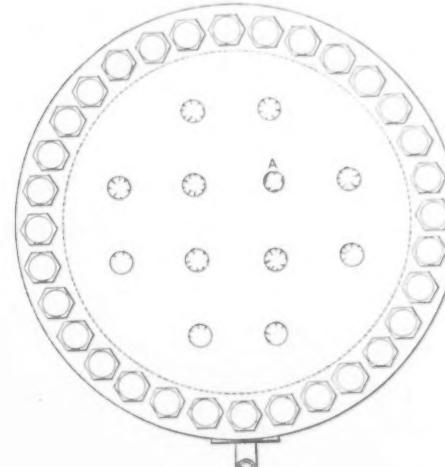


Fig. 2.

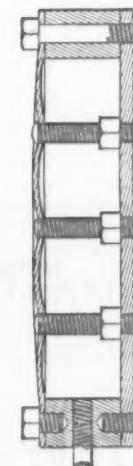


Fig. 3.



Fig. 4.

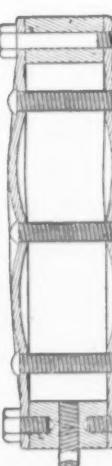


Fig. 5.

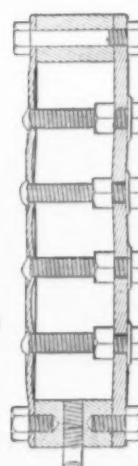


Fig. 6.

drew out at an average strain of 32,785 pounds; those riveted with the low conical head made according to general practice, by leaving three threads through to form the head, required an average strain of 35,033 pounds to draw them through the plate, the rivet head giving an additional strength of 224 pounds in a 1-inch stay-bolt.

In testing those with low conical heads, it was observed that the bulging of the plates caused the lap of the rivet head on the plate to commence giving way and to break off some time before the maximum strain was reached, thus leaving more for the threads on the bolts to sustain. As the strain and bulge of the plates increased, the plate around the bolt turned downward and outward until the threads in the plate almost entirely cleared those on the bolts, so that in almost every case there were only from one to two threads stripped or injured on the bolt when it drew out; therefore it was deemed advisable to form the head in a different manner, and, after several experiments, it was decided that the rivet head should be made as follows: First, by leaving as much of the bolt through the plate as could be riveted over without injury to the iron, which was, in case of the excellent iron being used, equal in length to about one-half the diameter of the bolt. This was riveted over in the following manner: A few quick, sharp blows were struck on the end, slightly upsetting the iron; the head was then formed to shape with a button-head set made to a spherical segment. It was found that this could be done in nearly the same time as that used in riveting the ordinary low conical stay-bolt heads at the Washington yard, and with much less injury to the iron; also that it only required one riveter and a helper; whereas, by the old method, two riveters were used.

Three trials were then made with half-inch iron plates and 1-inch iron stay-bolts, not riveted; riveted with ordinary low conical head, with three threads left through for riveting; riveted with button-head, a little over five threads left through for riveting; and with button-head the size of stay bolt being increased to $1\frac{1}{4}$ inches. The supports were by bolts in each corner of the plate, 4 inches and 5 inches from center to center of supports; the stay-bolt being in the center of the plate, equally distant from each support. The ultimate average strain required to pull the above bolts through the half-inch plate was as follows:

Thickness of plates, inch	Distance from center to center of stay bolts, in.
	.4
Diameter of stay-bolts outside of threads, inch	.1
Diameter of stay-bolt heads at base, inches	.15
Height of stay-bolt heads, inch	.15
Number of threads on stay-bolt per inch	12
Threads left projecting to form head	5
Tensile strength of each stay-bolt, lbs	32,072

At a pressure of 800 pounds the bulge was $1\frac{1}{10}$ of an inch, which was increased at 1,000 pounds to $23\frac{1}{2}$ of an inch, the first leak appearing around the stay-bolt heads. At 1,300 pounds the set was $17\frac{3}{4}$ of an inch, and the bolt head marked A, in Fig. 2, was stripped off, i.e., bolt, while the others were damaged, as shown in the drawing.

Fig. 3 was chosen as an example of the

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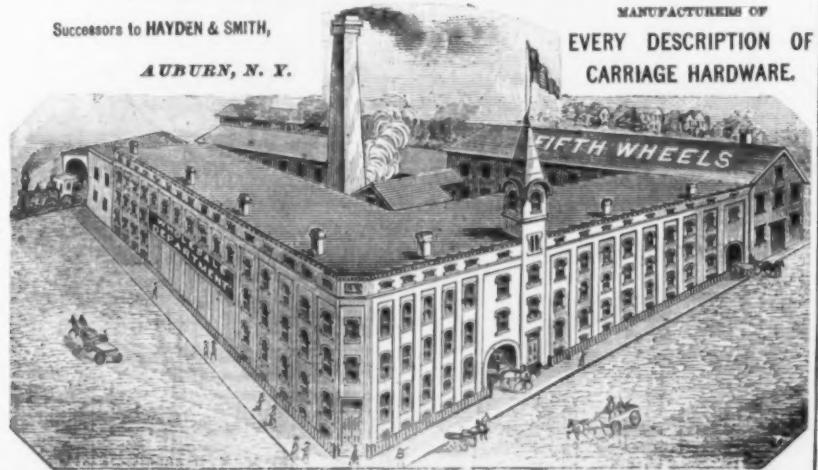
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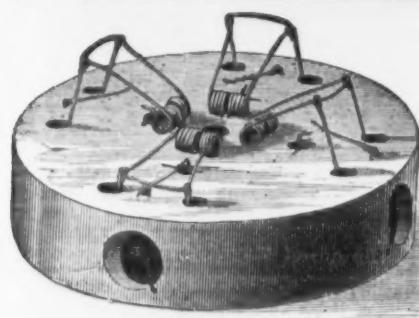
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HAND OR POWER. 25 and 40 qts. \$75.00 and \$175.00
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No. 1 Commercial Street, Newark, N. J.

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94 Chambers St., New York, Agents for

American Screw Co.'s Wood Machine and Rail Screws, Stove and Tire Bolts, Rivets, &c.
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DEPOT FOR

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Irons and Cleavers.
E. W. Gilmore & Co.'s Strap and T Hinges.
Russell Jennings' Auger and Dowel Bits.
Also a general assortment of Hardware.

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For Superiority.

1878

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MANUFACTURERS OF

AMERICAN AND FRENCH WIRE NAILS, TACKS, SHOE NAILS, And Every Variety of Small Nails.

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Warehouse at 78 Chambers St., New York,

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Any variations from the regular size or shape of the above-named goods made from sample to order.

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THE BEST FOR MALTSTERS
THE BEST FOR MINERS.

ALWAYS FIRST PREMIUM.
NO CORNERS TO CATCH.
THROWS FREE AND CLEAR.
200,000 IN USE.
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MILL BUCKET.
In 3½ in. to 10 in.

DUG'S PATENT

THE STOREHOUSE BUCKET.
(Partial straight front.)
In 12 in., 14 in., 16 in. and 17 in. Sizes.
Very Durable and Strong.

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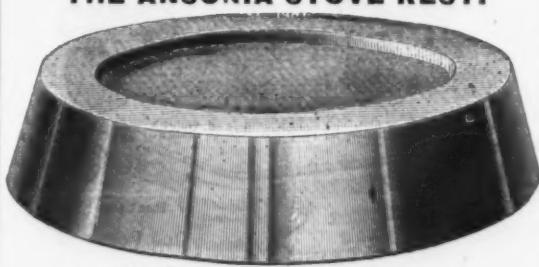
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Some other manufacturers claim to make a hot forged Nail, but you will observe on all such a sheared edge near the point.

THE PUTNAM NAIL CO., Boston.

P. O. Address, Neponset, Mass., U. S. A.

effect of shaping the iron stay-bolt heads in the form of low cones. The plates were of iron. The principal dimensions were:

Thickness of plate, inch.....	1/8
Distance from center to center of stay-bolts, inches.....	1/2
Diameter of stay-bolts outside of threads, inch.....	1/4
Diameter of stay-bolts inside of threads, inch.....	9/16
Diameter of stay-bolt heads at base, inches.....	1/2
Height of stay-bolt heads, inch.....	1/4
Number of threads on stay bolts per inch.....	12
No. of threads left projecting to form head.....	5
Tensile strength of each stay-bolt, lbs.....	32,685

The following tables show the bulge and set at various pressures:

Fig. 6.			Fig. 7.		
Pressure.	Bulge.	Set.	Pressure.	Bulge.	Set.
Pounds.	Inches.	Inch.	Pounds.	Inches.	Inch.
200	0	0	200	3/32	0
900	1/64	0	900	1/16	0
300	1/32	0	300	1/16	0
400	1/32	0	400	1/16	0
500	1/32	0	500	1/16	0
600	3/64	0	600	3/32	0
700	1/16	0	700	7/32	1/16
800	1/64	3/16	800	1/16	5/16
900	1/64	5/16	900	1/16	7/16
1,000	0	9/32	1,000	1/16	9/16
1,100	25/64	13/64	1,100	1/16	11/16
1,150	15/32	15/32	1,150	1/16	13/16

At only 200 pounds pressure the bulge was 1/32d of an inch; this rose to 1/16d of an inch at 300 pounds, the set being 1/32d of an inch; at 400 pounds these figures had increased to 1/64 and 1/16d of an inch respectively, and they reached 9/32ds and 1/16 at 500 pounds. At the latter pressure the center stay-bolt was badly split around its edges and leaked on relieving the pressure from that point. At 580 pounds the head and thread stripped from the center bolt, and thread stripped from the center bolt, while the other bolt heads were but slightly damaged.

Compared with this, Fig. 4 shows some improvement, the stay-bolts having been formed with a button-head set. The chief dimensions were:

Thickness of plate, inch.....	1/8
Distance from center to center of stay-bolts, inch.....	1/2
Diameter of stay-bolts outside of threads, inch.....	1/4
Diameter of stay-bolts inside of threads, inch.....	9/16
Diameter of stay-bolt heads at base, inches.....	1/2
Height of stay-bolt heads, inch.....	1/4
Number of threads on stay-bolts per inch.....	12
No. of threads left projecting to form head.....	5
Tensile strength of each stay-bolt, lbs.....	32,979

A bulge of 1/16d of an inch became noticeable at 300 pounds, which increased

Diameter of stay-bolts outside of threads, inch.....

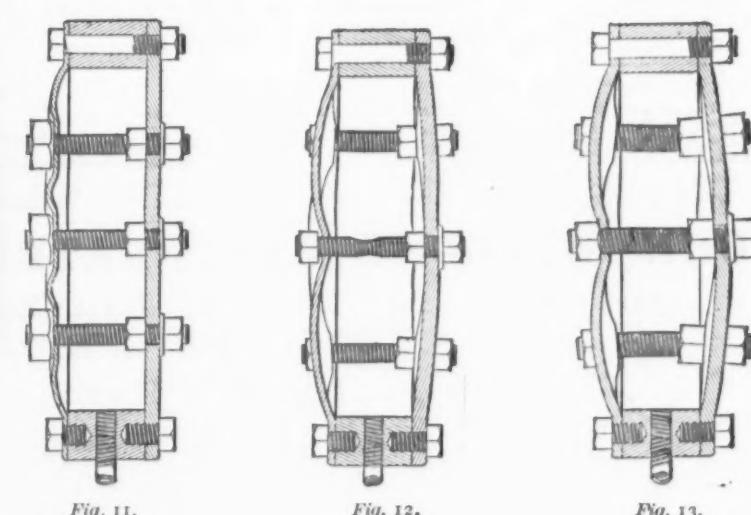
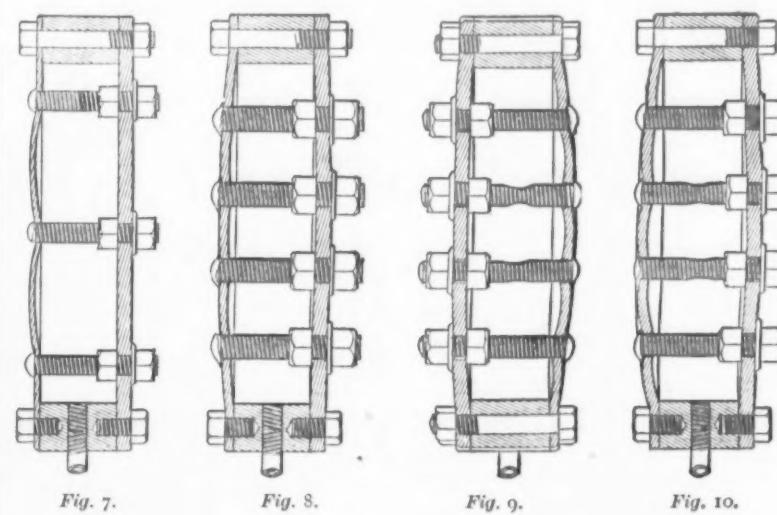
Diameter of stay-bolts inside of threads, inch.....	1/4
Diameter of stay-bolt heads at base, inches.....	1/2
Height of stay-bolt heads, inch.....	1/4
No. of threads on stay-bolts per inch.....	12
No. of threads left projecting to form head.....	5
Tensile strength of each stay-bolt, lbs.....	32,685

The following tables show the bulge and set at various pressures:

Fig. 6.			Fig. 7.		
Pressure.	Bulge.	Set.	Pressure.	Bulge.	Set.
Pounds.	Inches.	Inch.	Pounds.	Inches.	Inch.
200	0	0	200	3/32	0
900	1/64	0	900	1/16	0
300	1/32	0	300	1/16	0
400	1/32	0	400	1/16	0
500	1/32	0	500	1/16	0
600	3/64	0	600	3/32	0
700	1/16	0	700	7/32	1/16
800	1/64	3/16	800	1/16	5/16
900	1/64	5/16	900	1/16	7/16
1,000	0	9/32	1,000	1/16	9/16
1,100	25/64	13/64	1,100	1/16	11/16
1,150	15/32	15/32	1,150	1/16	13/16

While in Fig. 6 no leaks were apparent at 1000 pounds, although all stay-bolt heads were considerably split at their edges, the center stay-bolt was badly split around its edges at 350 pounds pressure, in the case of Fig. 7. The first leaks appeared on relieving the pressure from 400 pounds, and under 500 pounds the head was stripped from the center bolt.

The results of using thicker plate are exhibited by Figs. 8, 9 and 10, which at the same time show the difference between iron (Fig. 8) and steel (Figs. 9 and 10) stay-bolts.



to 1/8-inch by the addition of 100 pounds of pressure, a set of 3-32ds of an inch taking place. At 500 pounds both bulge and set amounted to 7-16ths of an inch, and the box leaked considerably at both ends of the center stay-bolt, and most of the other stay-bolt heads were split at their edges. At 700 pounds the head stripped from the center stay-bolt and the bolt drew clear of the hole.

The effect of a thicker plate and a smaller number of iron stay-bolts is clearly visible in the results of testing the box shown in Fig. 5, the main data relating to which are as follows:

Thickness of Plates, inch.....	1/8
Distance from center to center of stay-bolts, inches.....	1/2
Diameter of stay-bolts outside of threads, inch.....	1/4
Diameter of stay-bolts inside of threads, inch.....	1/4
Diameter of stay-bolt heads at base, inches.....	1/2
Height of stay-bolt heads, inch.....	1/4
No. of threads on stay-bolts per inch.....	12
No. of threads left projecting to form head.....	8
Tensile strength of each stay-bolt, lbs.....	51,277 41,483

The greatest bulge and permanent set was in the case of Figs. 8, 9 and 10, as follows:

Fig. 8.			Figs. 9 and 10.		
Pressure.	Bulge.	Set.	Pressure.	Bulge.	Set.
Pounds.	Inch.	Inch.	Pounds.	Inch.	Inch.
800	0	0	1,000	1/64	0
1,000	1/64	0	1,200	1/16	0
1,200	1/64	0	1,400	1/16	0
1,400	1/16	0	1,600	1/16	0
1,600	1/16	0	1,800	1/16	0
1,800	1/16	1/16	2,000	5/32	1/8
2,000	5/64	1/16	2,200	15/64	1/16
2,200	3/32	1/16	2,400	15/64	1/16
2,400	3/16	1/16	2,600	21/64	17/64
2,600	11/32	5/16	2,800</td		

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FRIEDMANN & LAUTERJUNG,

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To open 2, 2½, 3, 4, 5, 6, 7,
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8 and 10 inches.

Strongest and Best Clamp Made.

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Five sizes.

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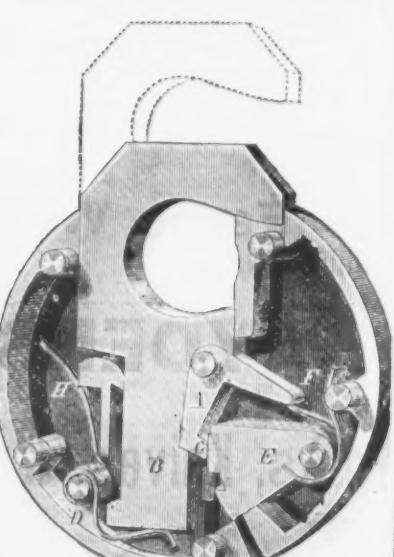
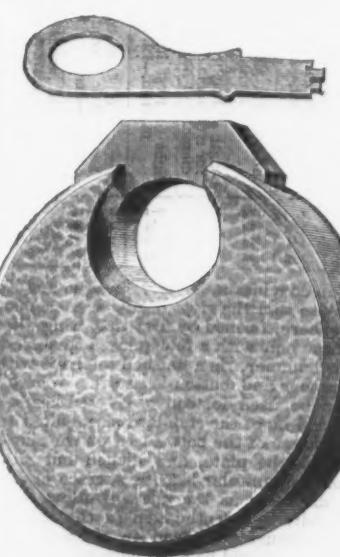
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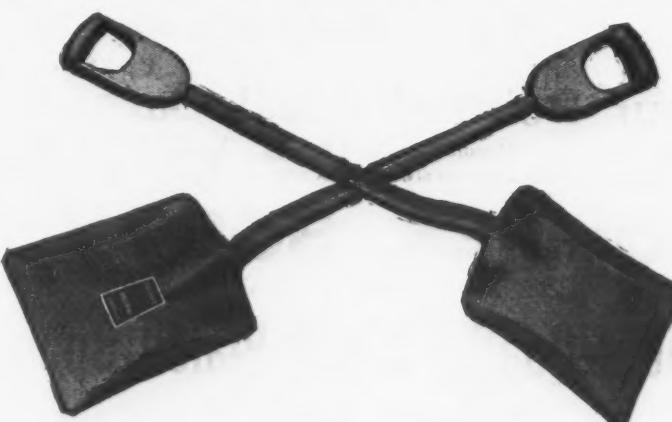
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SPADES and
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13

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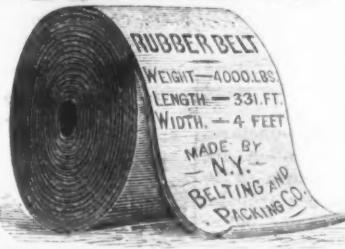


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Ball Valves,
Car Springs,
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Machine Belting,
Wringer Rolls,
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Grain Drill Tubes,
Emery Wheels.

the best judges of the quality of tin plates, but no person among them that has had any experience whatever in handling or working sheets of tin is so densely ignorant as to be incapable of telling the difference between the various grades I have mentioned? The large consumers—such as the can makers, the tinware manufacturers and the larger roofers—pay very little attention to the marks on the boxes, whether private or makers' brands, but judge the quality of a plate by actually testing and working a sample sheet or sheets. To them the brands are only useful for reference, as there are so many grades that the sheets have to be called something.

"not complain without cause, inasmuch as the 350 makers of tin plate are going under 1500 aliases, thus making 1850 names for 350 kinds of plates." While keeping this in mind, it must also be remembered that considerable quantities of tin plates have been imported without brands, and have been "named" here to suit purchasers. Surely it is time something were done to correct an evil of such magnitude.

The correspondent referred to above asks at the close of one of the paragraphs in his letter: "Is there anything wicked in such a practice?" He recites, before asking this question, an imaginary case where "A. & Co." order a certain grade of plate made, and have put upon it a brand of their own selection in order to retain the exclusive control of the market in that brand. Incidentally he calls attention to the possibility of some Anglo-Saxon word replacing an "unpronounceable Welsh jaw-breaker" as one of the advantages in this arrangement.

To answer his question briefly, we would say that there is nothing wicked in such a practice, but such practice, though innocent in itself, may be most outrageously abused. Suppose "A. & Co." after working up a trade in this particular brand of tin plates, fail to agree as to terms with the manufacturer from whom they got the original lot, and to fill their orders are obliged to obtain plates elsewhere; or, suppose that, instead of endeavoring to maintain the quality of plate indicated by their brand, they buy a cheaper article of inferior grade and send it out to their customers under the name which had heretofore indicated a fair quality. How stands the case then? Is not this obtaining money by false representations? To our mind there is something decidedly "wicked in such a practice." Such plans as these have been resorted to both by merchants in this country and by dealers on the other side. It is this part of the private brand business that should be stamped out.

Let us cite a case in point: A correspondent of one of our contemporaries writes as follows: "I am a sufferer from the disease under discussion. With your permission I will briefly state my experience. Being last year in want of a certain quality of tin plates to satisfy the steady demand of a certain class of my customers, after some difficulty I accepted the offer of a large and well-known firm of tin merchants to send me a few sample boxes, which being found to suit my customers, led to an order in bulk, which was soon cleared out, giving entire satisfaction. I then ordered the same brand, of the same firm, at a little advance in price, owing to the state of the market, which instead of being pronounced as the previous lot had been, all they desired, were denounced by the unanimous voice of my clients; and instead of being sold as they ought, and would have been nine months ago, had they been equal to the previous lot, part were disposed of at a sacrifice, and the remainder are still in my warehouse, to be got rid of as best I may—all remonstrance being unheeded under the specious plea 'that they are the same as the last.' The merchants with whom I dealt have thus sold their trade with me along with the tin I bought. I can no longer have confidence in any house that thus treats a customer."

Patent Elastic

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REST IN THE WORLD.

For Packing the Piston Rods & Valve Seats of Steam Engines & Pumps.

Rubber Back Square Packing

Pat. Jan. 26, 1869.

A

B

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Corrugated Rubber Mats and Matting,

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COTTON AND BALE HOOKS,
Patented Feb. 13, 1877; a new combination of Hooks.
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Manufacturers of
R. R. Track Scales, Hay Scales, Coal
Scales, Grain Scales, Platform
Scales, Counter Scales, &c.

Send for price list, stating what you want.

The St. Gotthard Tunnel Accident.—A Geneva dispatch to the London Times says: By the explosion of the dynamite magazine belonging to the St. Gotthard railway contractors at Faido, on Saturday last, three persons were killed and 20 injured. Several of the injured are not expected to recover. The accident in the tunnel on the 6th inst., when a portion of the roof fell, will not seriously interrupt the work.

Labor troubles have recommenced in Great Britain, an attempt having been made to again reduce the wages of iron workers in the north of England. Is the proposed reduction in wages intended to meet the reduced price of iron in this country? If so, the good effect of paying living prices to workmen here is apparent. The iron workers who have struck have done so in spite of the fact that the reduction was authorized by a board of arbitrators—in other words, the arbitration attempted in this case has failed. But it has succeeded in averting strikes and lock-outs in hundreds of other cases, and the fact that it failed here raises the presumption that the workmen have some good reason for their course.

The Iron Age

AND

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New York, Thursday, May 20, 1880.

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JAMES C. BAYLES - - Editor.
JOHN S. KING - - Business Manager.

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The strong opposition manifested by so large a number of the members of the Western Nail Association against the reduction in the card on nails from \$4 to \$3.25, indicates that they, at least, believe that the bottom of the reduction in the prices of nails has been about reached. It is stated that the vote in favor of reducing prices stood 9 to 8, with several refusing to vote, though the vote of these might not have affected the result, as they would have voted, it is understood, in about the same ratio as the vote was announced. The arguments in favor of reduction were, it is stated, mainly that nails were selling by jobbers and speculators far below \$4, that the country were expecting a reduction to about \$3.25, and that consumers would not buy until the reduction was made. Against

this it was argued that they would not buy even at the reduction, and that speculators and jobbers would continue to undersell. So far as we can learn at the present writing, the latter were correct. Trade has not been stimulated, and speculators are offering what few nails they have left below the \$3.25 card. One thing may be taken for granted by the nail men; they will not get trade on a legitimate basis and begin to receive orders until they allow these stocks of cheap nails to get out of the way, and show the country that they do not propose to go lower.

Congress and the Tariff.

Congress has kept the country more or less excited for about half a year on the subject of tariff revision, and is now about to adjourn without having made so much as a serious attempt to change that instrument in any essential particular. We are not surprised at this; but no one who considers the subject intelligently from a business standpoint can fail to regret that the obvious unwillingness of the House of Representatives to do anything was not allowed to find definite expression in a resolution which would have expressed the real feeling of that body, and, at the same time, have quieted the anxiety to which the constant and wholly insincere talk about tariff revision has given rise. No doubt there are some members of the House, and especially of the Ways and Means Committee, who believed that it was both possible and desirable to secure the passage of certain important bills reducing duties, and our well-informed Washington correspondent, whose letter is elsewhere printed, states that Mr. Tucker and Mr. Morrison are still of this opinion. It requires no especially intimate knowledge of matters at the capital, however, to see that a majority of Congress does not expect or desire that any action shall be taken this year, and this might as well have been distinctly stated three or four months ago as not. Even among those who are generally favorable to a careful and judicious revision of the tariff, all but a few unreasoning enthusiasts see that the Committee of Ways and Means is not equipped for this work, and that anything which comes from them will be as unsatisfactory and as much open to objection as the tariff as it stands.

Tariff tinkering is a very different thing from intelligent and comprehensive tariff revision. The latter we can never have until the work is intrusted to a qualified commission of experts appointed from civil life, who can give the subject that careful study which its importance demands, and, by equalizing and simplifying the rates of duty with intelligent reference to the conditions and requirements of the industries and trades affected, remove all reasonable objections to the tariff without abandoning the essential principle of protection to American industry. Those who think we can with advantage—or, at least, without injury—dispense with protection, belong to a class of doctrinaire whose views are entitled to very little consideration. Either they are ignorant of the conditions existing here and abroad, or they are actuated by a desire to promote selfish interests, which they think can best be promoted by the destruction of so much of our industrial system as free trade would ruin. By dallying with these questions and refusing to commit itself to a definite expression of the views and intentions of the majority, Congress betrays the business interests of the country. That it adjourns from year to year without important action, does not excuse the perpetual menace of action, with its disquieting influence upon our productive and distributive industries. The man who flourishes a pistol in the face of another may do him serious harm, even though the pistol is not loaded, or, being loaded, is not intended to be discharged. Session after session a noisy little minority make the country uneasy by breathing out threatenings and slaughter against protection. Session after session ends and protection still stands. How much better to give the country the assurance that the conservative majority of the Senate and House are opposed to any sweeping change, and that no hasty or ill-considered action will be taken on any question affecting our industrial system. But probably this is more than we can expect of Congress.

Information elsewhere given in our columns with regard to the awards of honors to American exhibitors at the Sydney (N. S. W.) Exhibition, show that our manufacturers have won another conspicuous success in that important corner of the world. Since the Centennial our manufacturers have entered these international contests with spirit and enthusiasm, and in every instance—except, perhaps, at Vienna—they have appeared to conspicuous advantage. This is not at all surprising. There is something about American products which command attention wherever they are seen. They are not, as the rule, so cheap as competing products of Great Britain, but there is something about them which British goods do not have. Even when no better in quality, they command approval because of their ingenuity, their shapeliness or their perfect adaptation to the uses for which they are intended. In a new country like Australia there are so many conditions similar to those which exist in our own country, that it is not to be wondered at that our manufacturers have won hearty approval. Such communities are not hampered by tradi-

tions. The usage of generations does not commend to the people of that country, any more than to our own people, tools and implements which lack something of perfect adaptation to the requirements of those who use them. Where labor is scarce and high priced, it is best economized by machinery, tools and appliances which give the best results with the least expenditure of effort.

Manufacturing Statistics in the Census of 1880.

The special schedules of manufactures for the coming census enumeration are twelve in number. What is known as the schedule of manufactures proper excludes boot and shoe factories, cheese and butter factories, flouring and grist mills, salt works, lumber mills and saw mills, brick yards and tile works, paper mills, coal mines, agricultural implement works and quarries, which will be reported on a special manufacturing schedule. In the general schedule of manufactures the term "productive industry" is used to denote not only all factories and large works, but also the mechanical trades, as blacksmithing, carpentering and coopering. Every shop is to be included the production of which is \$500 annually, including cost of materials, and the kind of business is to be described specifically. The questions are as to the name of the corporation, company or individual; the name of the business, manufacture or product; the capital invested, the greatest number of hands employed at any one time during the year, the average number of hands employed, including males above sixteen years, females above fifteen years and children and youth; the number of hours of ordinary daily labor from May to November and November to May; the average day's wages for skilled mechanics and ordinary laborers; the amount paid in wages during the year the months in operation on full time, three-quarters time and two-thirds time, and the number of months of idleness; the value of material, including mill supplies and fuel; the value of product, including jobbing and repairing; the kind and amount of power used, whether water or steam, with description of the streams or the number of boilers and engines. The value in horsepower of the water and steam power is considered a matter of great importance, as are the inquiries with regard to the value of material and the value of product. The cost of superintendence, rent, freight of goods to market and other general expenses of a manufacturing establishment are not to be included in materials. Mill supplies and fuel are included. The value of the product, in the case of mills and factories producing for distant market, means the wholesale price of the goods. In the case of small shops producing goods or doing work for the neighborhood only, the value of the product means the price charged at the shop.

The twelve special schedules above mentioned are amplifications of the schedule of manufactures above outlined. The schedule of agricultural implements contains, in addition to the questions in the principal schedule, questions as to the total value of all materials, the seeders and planters, implements of cultivation, harvesting implements, seed separators and miscellaneous implements produced, with the total value of all the products. The additional questions in respect to paper mills are with regard to tub and other engines, paper machines, materials and products, with their total value. The additional questions with regard to boots and shoes are as to the materials used, the products and their total value, and the tanning and currying of leather by persons or companies engaged in that business. The special questions with regard to lumber mills and saw mills are as to the saws, materials, the proper saw mill products, remanufactures, the system of logging, the shipping and the total value of products and remanufactures. The special questions affecting brick yards and tile works are as to materials and products. The additional questions with regard to flour and grist mills are as to the maximum daily capacity, custom work or market work, the use of elevators, the total value of all materials and the amount and total value of all products. The additional questions concerning cheese factories, butter factories, combined butter and skim cheese factories and condensed milk factories are divided into questions applicable to all the factories, and questions applicable to each particular kind of factory, following the plan of other special questions. The special questions as to slaughtering and meat packing call for the number and value of all animals killed, and the value of fresh, salt and cured meats and other products. The final special schedules concern small coal mines and quarries. The special questions with regard to coal mines relate to the kind of coal mined, the cause of any fires, the principal market, mode of transportation, accidents to persons during the year, maximum capacity, dimensions of mine, machines used, amount and value of products. The questions as to quarries are the same as those concerning coal mines, excepting, of course, as to the nature of the product and the danger from fire.

The statistics thus gathered will be of the greatest interest and value, and manufacturers of all classes should feel a direct and personal interest in giving the enumerators

the fullest and most exact information possible. The arrangements made for the collection and tabulation of the statistics of iron and steel insure completeness and accuracy, but it is to be feared that our manufacturing industries in general are not likely to be so well attended to. In any case, the success of the work depends upon the intelligent co-operation of our manufacturers, and we hope this will be given in every case.

The Manufacture of Steel in Great Britain.

Mr. J. S. Jeans, Secretary of the British Iron Trade Association, in a report just published of the statistics of the British iron and steel trade for 1879, furnishes figures which will be read with interest. The returns from the Bessemer steel works, which are stated to be complete, show the following as the number of establishments working, the number of converters used by them, the production of ingots and of rails:

District.	No. of works operative.	No. of Bessemer converters at work.	Production of Ingots, Tons.	Production of rails, Tons.
Sheffield	7	22	210,346	82,774
South Wales	4	15	252,573	189,503
Lancashire	4	14	152,130	73,870
Cumberland	2	7	127,163	23,969
Nor. E. Coast	2	6	85,299	69,255
Staffordshire	1	3	7,200	860
Total	20	66	834,711	520,231

What is most remarkable in these figures is that only a part of the ingot capacity of the works in operation is devoted to the manufacture of steel rails. It may be of interest to ascertain, approximately at least, what proportion of the steel made in England in 1879 has been rolled into rails, and about how much has been turned over for other purposes. If we assume that the wastage, &c., in making rails is about equal in this country and England, it would require 120 tons of ingots to produce 100 tons of finished steel rails. At this rate 520,000 tons of steel rails would call for 625,000 tons of ingots, thus leaving about 200,000 tons of ingots which were used in Great Britain for other purposes. We know that during 1879 little or no English steel was shipped to this country in the shape of blooms, and are forced to the conclusion that fully one-fourth of the Bessemer steel made in England is consumed in the manufacture of articles for which that material has not yet become available in this country. This movement is one of recent origin, its strength never having been so decided revealed before. In 1878, 622,390 tons of rails were made from 807,527 tons of ingots, leaving a small quantity for general purposes. The abandonment of the rail trade on the part of some Bessemer mills is significant, and we need only glance over the table given in the above to find indications of the direction in which this material is now flowing. It will be noticed at once that Sheffield, while it produced 210,346 tons of ingots, did not turn out more than 82,774 tons of rails. At least 100,000 tons of metal have been used in other trades of that district, and even after deducting a fair allowance for ship and armor plates, guns and other war material, a very large amount remains as probably consumed by cutlery manufacturers. For cheaper grades of goods no metal is probably more suitable than the best grades of Bessemer steel, and it is likely that free use of it on the part of Sheffield firms will give them an important advantage over their rivals in other countries. American manufacturers will, probably, in the near future, be obliged to give this matter more serious attention.

When compared to that of the United States, the production of steel in Great Britain has ceased to be so formidable. Our Bessemer works turned out during the year 1879, 829,439 gross tons of ingots, against 834,711 for Great Britain, so that we have very nearly reached their output. It is a remarkable fact, highly flattering to Americans, that this product was achieved with only twenty-two converters, while it took sixty-six English vessels to do the same amount of work. As far as the production of steel rails is concerned, America now stands unrivaled, having turned out 610,682 tons, against 520,331 tons made in England. While we are adding to our plant ten additional converters, eleven new vessels are being built in England, eight of which are in the Cleveland district, thus swelling the total number of converters in Great Britain to 115.

Little progress is being made in England in the production of open-hearth steel, the output in 1878 having been 176,000 tons, while in 1879 it was 175,000. The following table gives the details:

District.	Number of open-hearth furnaces erected.	Production of steel in Tons.
South Wales	48	85,000
Scotland	46	50,000
Sheffield	15	21,000
Lancashire and Cheshire	12	15,000
Northeast Coast	6	1,000
Other districts	6	3,000
Totals	102	175,000

We may add, in conclusion, that the United States turned out during the year 1879 about 50,000 tons of open-hearth steel, the capacity in this country being still very considerably inferior to that of Great Britain, though probably growing more rapidly.

The Duty on Steel Rails in France.

While in this country, the campaign of those interested in the importation of steel rails against the present duty has proved a failure, the efforts of the free traders have been much more successful in France. More than a year since a committee was appointed by the Chamber of Deputies to inquire into the status of the various industries of France, and to report upon the feasibility of readjusting the tariff

warehouses small capitalists could not do importing business there, because the duty was often more than the first cost of the merchandise. More mines are being opened there than ever before, creating demands for mining machinery and implements.

The result of the discussion was the appointment of a committee to memorialize the Mexican government. Undoubtedly the railway connections soon to be completed in the direction of Central America and Mexico are destined to work great changes in the trade of the West Coast, in which steam navigation will play an important part. The growing abundance of money will aid in the extension of credits, so essential to success in competing with Europe.

Our Foreign Trade in 1879 and 1880.

The Bureau of Statistics at Washington has just published particulars of our trade with the various foreign countries during the calendar year 1879 as compared with 1878. We have prepared therefrom a few tables showing the domestic export and the import only, suppressing the foreign export, which amounted to only \$10,503,070 last year and to \$13,805,252 in 1878, since it would have rendered our statistics altogether too unwieldy.

We have reduced everything to millions of dollars and decimal fractions:

AMERICA.	Export.		Import.	
	1879.	1878.	1879.	1878.
Argentine Republic....	2.16	1.63	3.49	4.59
Brazil.....	8.88	8.72	46.59	49.72
Central America.....	1.33	1.17	3.29	3.11
Chili.....	1.02	1.37	0.63	0.60
Danish West Indies.....	6.77	0.79	3.35	0.48
French West Indies.....	1.69	1.55	2.24	2.96
French Guiana.....	0.01	0.01	0.01	0.01
Miquelon.....	0.28	0.31	0.01	0.01
Nova Scotia, N. Bruns-wick and P. E. Islands.....	2.81	5.48	3.84	3.56
Quebec, Ontario, Man-toba and N. W. Ter.	20.67	23.37	33.25	20.65
British Columbia.....	1.97	1.38	0.97	0.89
New Zealand and Ne-W. Zealand and Labrador.....	1.27	1.10	0.30	0.29
British West Indies.....	6.32	7.31	3.00	4.84
British Guiana.....	1.66	1.93	0.82	0.75
British Honduras.....	0.29	0.27	0.27	0.27
Haiti.....	3.16	3.49	3.26	2.09
Mexico.....	5.67	5.36	6.09	5.20
Dutch West Indies.....	0.57	0.68	0.84	0.67
Dutch Guiana.....	1.11	1.17	0.74	0.73
Pern.....	1.17	1.20	0.74	0.31
St. Domingo.....	0.74	0.65	0.46	0.40
Cuba.....	11.43	11.48	57.74	60.44
Porto Rico.....	1.97	1.64	4.15	4.03
Colombia.....	5.26	4.76	6.91	5.56
Uruguay.....	0.84	1.87	2.33	2.17
Venezuela.....	2.13	2.38	5.31	6.03
Totals.....	83.64	89.61	277.44	274.09

EUROPE.	SHIPMENTS OF IRON AND STEEL FROM GREAT BRITAIN TO THE UNITED STATES SINCE THE REVIVAL, IN TONS.	
	Oct.	Nov.
Austria.....	2.38	2.54
31.03	27.74	6.35
Denmark.....	2.74	3.47
Iceland.....	...	0.08
France.....	99.75	98.15
Germany.....	50.71	50.63
England.....	319.03	307.69
Scotland.....	26.19	23.82
Ireland.....	57.45	52.47
Gibraltar.....	1.93	1.62
Greece.....	0.13	0.93
Italy.....	9.93	8.80
Holland.....	15.73	15.13
Portugal.....	4.75	4.75
Russia, Baltic.....	14.37	14.25
Russia, Black Sea.....	0.95	0.27
Spain.....	14.05	8.86
Scandinavia.....	2.15	2.02
European Turkey.....	2.65	2.84
Totals.....	547.16	613.75
ASIA AND OCEANICA.		200.85
China.....	2.93	3.04
British India.....	1.40	0.99
Hong Kong.....	3.23	3.31
Australasia.....	5.21	7.13
Other Brit. Islands.....	0.19	0.19
Sandwich Islands.....	2.11	1.80
Japan.....	2.50	3.03
Dutch East Indies.....	2.35	1.40
Asiatic Russia.....	0.01	0.01
Philippine Islands.....	0.01	0.01
Asiatic Turkey.....	0.23	0.41
Totals.....	547.16	613.75
RECAPITULATION.		200.85
Europe.....	647.16	613.75
America.....	81.64	86.61
Asia and Oceanica.....	19.47	21.18
Africa.....	4.39	4.38
Total.....	734.66	739.02
GREAT BRITAIN AND HER COLONIES ALONE.		513.74
Nova Scotia, &c.	2.81	5.48
Quebec, &c.	20.67	23.37
British Columbia.....	1.97	1.38
Newfoundland & Labrador.....	1.27	1.10
British West Indies.....	6.32	7.31
British Guiana.....	1.66	1.93
British Honduras.....	0.29	0.27
England.....	319.03	307.69
Scotland.....	26.19	23.82
Ireland.....	57.45	52.47
Gibraltar.....	1.93	1.62
British India.....	1.40	0.99
Hong Kong.....	3.23	3.31
Australasia.....	5.21	7.13
Other Brit. As. Islands.....	0.19	0.19
Cape.....	1.99	2.09
Total.....	450.05	439.61
SHIPMENTS OF IRON AND STEEL FROM GREAT BRITAIN.		106.55
To all Countries.		106.55
Articles.		
Pig.....	1879.	1880.
Old iron.....	27,286	56,602
Steel, unwrought.....	4,394	35,764
Hoops and sheets.....	3,349	23,907
Bar, angle, bolt and rod.....	1,828	51,703
Balls, iron and steel.....	1,412	86,778
Total.....	38,914	93,084

AFRICA.	October 1 to May 1.	
	1878-79.	1879-80.
Algeria.....	0.58	0.71
Cape.....	1.99	2.09
Portuguese possessions.....	0.51	0.63
Tunis and Egypt.....	0.41	0.34
Other countries.....	0.86	1.14
Totals.....	4.39	4.38
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Total.....	450.05	439.61
SHIPMENTS OF IRON AND STEEL FROM GREAT BRITAIN.		106.55
To all Countries.		106.55
Articles.		
Pig.....	1879.	1880.
Old iron.....	24,572	231,135
Steel, unwrought.....	2,285	40,455
Hoops and sheets.....	15,380	23,920
Bar, angle, bolt and rod.....	15,548	34,577
Iron rails.....	3,750	16,804
Steel rails.....	25,402	45,287
Total.....	80,914	25,401

The recapitulation shows a remarkable increase in our European trade, while the export to American and Asiatic countries has slightly decreased, our import thence showing some increase. The total domestic export and the imports in 1879 was \$1,268,400,000, and in 1878, \$1,160,300,000. Another table shows the share which Great Britain and her colonies alone had in this trade, being \$646,600,000, or 51 per cent., in 1879, and \$587,890,000, or about 50 per cent., in 1878. This demonstrates both the magnitude and the steadiness of our British trade, which expands with the general movement.

After gathering a good deal of evidence on the best means of preventing smoke from locomotives with due economy of coal, a committee of the American Master Mechanics' Association, consisting of E. T. Jeffrey, H. A. Towne and Sanford Keeler, has reached the conclusion that large boilers and fire-boxes and careful firing, are the points which ought to be principally considered.

The British Board of Trade Returns.

No statistical data are likely to be studied with such eager interest at the present time by iron-masters as the returns published monthly by the British Board of Trade. To many, probably, the figures which we present below will be disappointing, as they have undoubtedly expected to see the decisive action of our manufacturers in meeting foreign competition by successive reductions of prices, in the April shipments of iron and steel from England to this country. As will be seen, this has certainly not been the case; on the contrary, a strong increase is noticeable in a number of important articles, swelling the total to unprecedented figures. The following are the returns for the month of April, 1879 and 1880, and the four months of both years ending May 1:

SHIPMENTS OF ENGLISH IRON AND STEEL TO THE UNITED STATES.

Articles.	April.		Four months.	
	1879.	1880.	1879.	1880.
Pig iron.....	4,897	135,724	14,689	368,247
Old iron.....	2,077	39,102	3,678	138,571
Steel, unwrought.....	530	7,627	1,963	18,752
Hoops and sheets.....	132	5,585	357	20,066
Bar, angle, bolts and rods.....	243	9,536	938	33,363
Iron rails				

**SUPERIOR QUALITY
North Carolina
MICA.**
We are prepared to furnish
Stove Manufacturers,
Oil Stove Manufacturers,
Jobbers and Retail Dealers,
WITH
MICA
of very best quality.
Estimates furnished on application.
J. S. & M. PECKHAM,
Utica, N. Y.,
Miners and Wholesale Dealers in Mica.

Thos. C. White & Co.
Manufacturers of
BUILDERS' HARDWARE,



TO STEAM USERS
Save Fuel and Money.

Obtain regular speed and prevent explosion by using

**PEERLESS
DAMPER REGULATOR,**

the greatest fuel-saving appliance ever invented. Adjustable to any pressure. In ordering mention pressure. Illustrated Catalogue sent on application. We set it up and guarantee performance. Price, \$75.

AMERICAN STEAM APPLIANCE CO.
SOLE MANUFACTURERS,

13 and 15 Park Row, NEW YORK.

**THE
"RIGHT SPEEDY"
CORN SHELLER**

Is the best Hand Sheller made; does the best work and works the best; is warranted five years. Agents Wanted in every County. Sample sent on receipt of \$5.00.

Specially adapted for export. Address Patentee and Sole Manufacturer.

CURTIS GODDARD
Alliance, Ohio, U.S.A.

CLARK'S RUBBER WHEELS.

This wheel is the best now in the market, and is attracting the attention of large manufacturers on account of the great saving of floors, which is ten times greater than the extra cost of this wheel.

Adapted to all purposes, viz., Warehouse trucks, platform trucks, scales, boxes, baskets and heavy casters. For full particulars see the first issue of *The Iron Age* next month, or address

GEO. P. CLARK, Windsor Locks, Conn.

WILLIAM H. AINET, Chairman.
Mellert Foundry & Machine Co., Limited,
Works established at Reading, Pa., in 1848.

CAST IRON WATER AND GAS PIPE,
With special Castings, Flange Pipe, Water Gates, Fire Hydrants, Lamp Posts, &c. **The Improved Canadian Turbine Water Wheel** Machinery and Casting Works, especially for Flour Mills, Rolling Mills, Grist and Saw Mills, Mining Pumps, Hoists, &c. Columns, Brackets, Iron Railings, &c.

ARNOLD MELLERT, Supt., Reading, Pa.

**PATENT
CONCAVE OX SHOES.**
The only forged Ox Shoe made with concavity to fit hoof, and the best and cheapest. Also, **Flat Shoes** with two calks at same price.

Greenfield Tool Co., Greenfield, Mass.

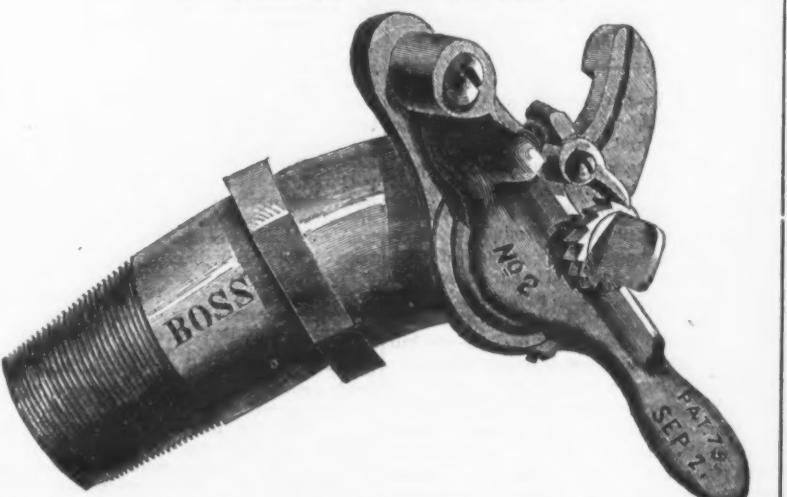
Keystone Screw Co.
17th and Venango Streets,
PHILADELPHIA.

J. BILLERBECK
Manufacturer of
Iron Gimlet-Pointed Wood Screws

NATIONAL BOLT CUTTERS
GUARANTEED AHEAD OF ALL
OTHERS FOR MANUFACTURERS &
MACHINISTS
SEND FOR CATALOGUE
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Send for "ALL ABOUT PATENTS," 140 Pages—Free, etc.

BOSS MOLASSES GATE.
Coddington's Patent.



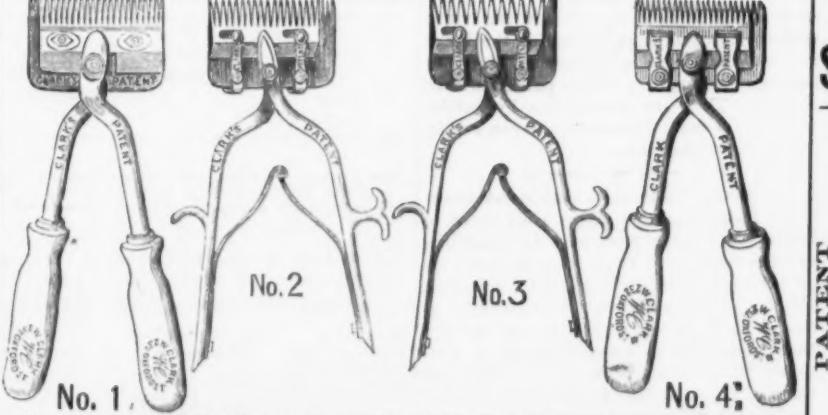
The only Molasses Gate made with **Ratchet** on **Tightening Screw**, to secure a regular pressure, and hold it securely so as to prevent leaking.

ALSO
KIMBALL'S SOLID CAST-STEEL SHOVELS & SPADES,
Lockwood's Solid Cast-Steel Hoes,

Norris Patent Frame Pulleys.

KIMBALL SHOVEL CO., Sole Manufacturers,
Office, 67 German Street, BALTIMORE, MD., U. S. A.

CLARK'S PATENT HORSE CLIPPERS.
Prize Medal Awarded, Paris, 1878.



No. 1.—This well-known Instrument has now been before the public for many years, and has given universal satisfaction, and is everywhere acknowledged to be far the best, and therefore has escaped the market. Nos. 2 and 3 have also met with great success. No. 2—**ONE-HANDED CLIPPER**, for horses, mares, quarters and difficult parts, leaving one hand at liberty to hold the horse, thus enabling the Clipping to be performed by one man only. No. 3—Same as No. 2, but with coarser teeth, for legs and bellies, and coarse hair which grows on the horse. The two plates are kept in cutting contact, and the machine requires no further adjustment whatever. These springs are annealed to Nos. 2 and 3. N. B.—No stable should be without this set of incomparable instruments. See that all these Machines are fully stamped in strict accordance with the above illustrations—none others being genuine. The whole set is sold at 25 dollars, and Messrs. **Hosmer Bros.**, 128 Chambers St., both of New York, and all merchants in the United States, will sell all Saddlers, Ironmongers and Cutters in the world, and of the Patentee, W. Clark, 232 Oxford St., London.

**BUFFALO CHAMPION
ICE CREAM FREEZERS.**
FOUR STYLES.

FIFTEEN SIZES.

**THE BEST
ICE CREAM FREEZER
IN MARKET.**

Please send for Illustrated and Descriptive Price List.

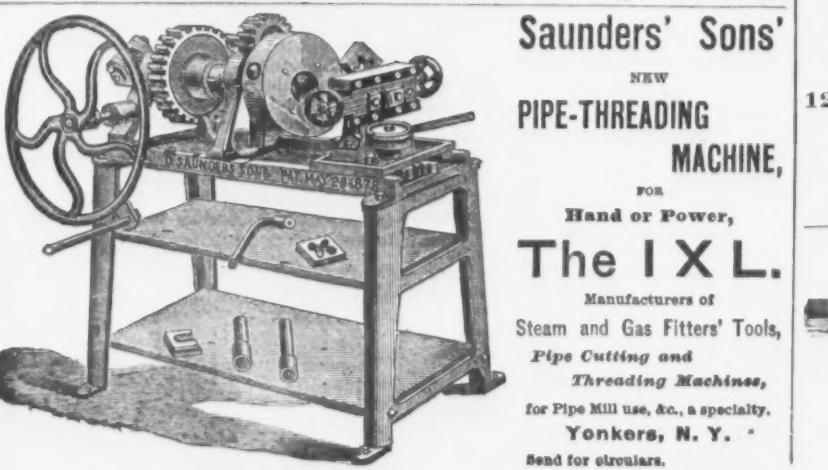
Sidney Shepard & Co.
PROPRIETORS

BUFFALO STAMPING WORKS,
BUFFALO, N. Y.,
AND
CHICAGO, ILLS.

Saunders' Sons'
PIPE-THREADING
MACHINE,
FOR
Hand or Power,

The I X L.

Manufacturers of
Steam and Gas Fitters' Tools,
Pipe Cutting and
Threading Machines,
for Pipe Mill use, &c., a specialty.
Yonkers, N. Y.
Send for circulars.



SPRING HINGES
WITH
Patent Anti-Friction Springs,
FOR
SCREEN DOORS.

PRICE LIST.—Per Dozen Pairs.
SINGLE JOINT HINGES.
(To Swing one Way.)

SIZE.	WITHOUT ACORN TIPS.		WITH ACORN TIPS.	
	BRASS.	NICKEL PLATED.	BRASS.	NICKEL PLATED.
2½ inch.....	\$ 3 00	\$ 4 50	\$ 5 00	\$ 6 50
3 " "	4 50	6 50	8 75	10 50
5 " "	7 50	10 00	10 00	12 50

DOUBLE JOINT HINGES.
(To Swing both Ways.)

To be used on Door 1 inch thick, or less.

SIZE.	WITHOUT ACORN TIPS.		WITH ACORN TIPS.	
	BRASS.	NICKEL PLATED.	BRASS.	NICKEL PLATED.
2½ inch.....	\$ 6 60	\$ 9 00	\$ 11 50	\$ 14 25
3 " "	8 30	11 50	13 50	17 00
5 " "	16 50	21 00	21 50	26 00
6 " Double for Office Doors.....				54 00

The large cut represents full size of our 5-inch Double Joint Acorn Tip Hinge for mortising. The small cut represents the plain Single Joint Hinges, but not full size.

Sample pair will be sent by mail on receipt of price.

Liberal Discount to the Trade.
SCOVILL MFG. CO., Nos. 419 & 421 Broome Street, NEW YORK.



We call the attention of the trade to the whistle for speaking tubes, represented in above cut, being superior, in a mechanical point of view, on account of the

PATENT ELLIPTIC SPRING,
which is much less liable to break and get out of order than the spiral spring usually used. These whistles being made entirely of metal, are very strong and durable. They are offered in a variety of styles at very reasonable prices. Send for illustrated circular and quotations.

We also invite an examination of our **PATENT REVERSIBLE DOOR LOCKS**, which by their peculiar construction, combine **simplicity, strength and durability**. In these locks the combination of the Patent Lever and Spring renders the latch movement very easy and prompt in action.

Illustrated catalogues and price lists furnished on application.

TRENTON LOCK AND HARDWARE CO.,
Manufacturers of Superior Building Hardware.

AGENTS.
JAMES M. VANCE & CO., 211 Market St., Philadelphia, Pa.; JAMES MARSHALL, 48 Warren St., New York.

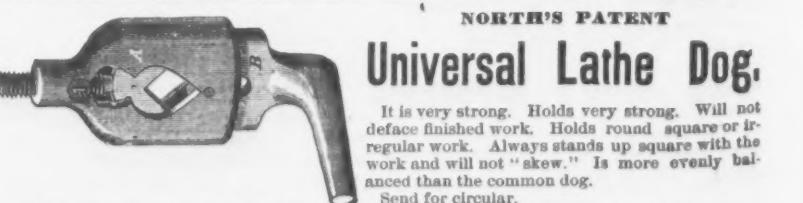
THE OHIO LAWN MOWER.



12-in. Cut....\$18.00. 14-in. Cut....\$20.00. 16-in. Cut....\$22.00.

For trade discounts, apply to

OHIO MFG. CO., Cleveland, Ohio.



It is very strong. Holds very strong. Will not deface finished work. Holds round square or irregular work. Always stands up square with the work and will not "skew." Is more evenly balanced than the common dog.

Send for circular.

SELDEN C. NORTH, No. 347 North Fourth Street, Philadelphia, Pa.

ANNUAL MEETING OF THE
British Iron and Steel Institute.

From the papers thus far received it does not appear that the meeting of the British Iron and Steel Institute on the 5th, 6th and 7th inst. has brought forward as much of interest to ironmasters and metallurgists as they have been accustomed to look for of late. We shall in the course of our report briefly state the contents of those which are of a more strictly scientific character, while we shall give those likely to be of practical value to American ironmasters at greater length. To us the following, by Arthur Willis, F. C. S., of the Landore Siemens Steel Works, Swansea, appears to be one of the most important:

ON THE REACTIONS IN THE OPEN-HEARTH PROCESS.

Steel from the open-hearth furnaces, as is well known, can be produced either from—

1. A mixture of pig iron and scrap.

2. Pig iron and iron ore without any scrap.

3. Pig iron, scrap and iron ore.

All these methods can be employed with advantage, but the most usual is the third—not that there is any special need to use scrap, but because it utilizes all scrap produced during the different stages of manufacture.

In the Bessemer process carbon, silicon and manganese appear to be eliminated uniformly. In the open-hearth process the degree and the time of elimination are quite different. During the time the charge is passing into the fluid state, carbon, silicon and manganese are all more or less oxidized, about 50 per cent. of the total amount contained in the charge, varying slightly with the temperature of the furnace. As soon as the whole of the charge is fluid, the carbon remains almost, if not entirely, stationary, until the whole of the silicon and manganese are oxidized, which process takes from three to four hours. During the time occupied by the oxidation of the silicon and the manganese—no gas being given off—the metal in the bath remains tranquil. When the silicon is reduced to about 0.02 per cent., and the manganese has disappeared entirely, the oxidation of the carbon commences, and the evolution of carbonic oxide throws the metal into violent ebullition, described by the melters as "being on the boil." This ebullition continues more or less until the carbon is reduced to 0.10 per cent. or under, when the metal becomes perfectly quiet, and the slag, which half an hour previously had been of a brownish tinge, begins to blacken from a slight oxidation of the metal.

From a number of analyses referring to the oxidation of carbon, silicon and manganese during the different periods of the process, I have selected two. No. 1 was an ordinary pig and ore charge with about 25 per cent. of scrap. No. 2 was a similar charge as far as composition was concerned, but after the pig and scrap were melted sufficient spiegeleisen was added to give by calculation 1.5 per cent. manganese. Samples of the metal in each case were taken every half hour and carefully analyzed, with the following results:

No. 1. No. 2.
Carbon. Silicon. Carbon. Silicon. Mang.
Per cent. Per cent. Per cent. Per cent. Per cent.

1. .000	1.34	1.34	1.00	1.47
2. .000	1.118	1.118	0.910	0.792
3. .000	0.906	0.906	0.600	0.500
4. .000	0.326	0.326	0.140	0.000
5. .000	0.232	0.232	0.080	0.000
6. .000	0.046	0.046	0.023	0.000
7. .000	0.000	0.000	0.000	0.000
8. .000	0.000	0.000	0.000	0.000
9. .000	0.000	0.000	0.000	0.000
10. .000	0.000	0.000	0.000	0.000
11. .000	0.000	0.000	0.000	0.000
12. .000	0.000	0.000	0.000	0.000
13. .000	0.000	0.000	0.000	0.000
14. .000	0.000	0.000	0.000	0.000

The irons now used at Hoerde are their own rejected foundry No. 3, foundry scrap, a half-mine forge pig, the white forge pig of Messrs. De Wendel, Messrs. Metz, of Luxembourg, and that of the Ilseide Company, in the province of Hanover. This latter contains as much as 3 per cent. of phosphorus and about 2.5 per cent. of manganese. The 3-ton plant produces about 40 tons daily, very nearly the same as when working the same converters acid lined. The shop is so cramped for room that rapid working is an impossibility. In this department, tires, axles, plates and material for wire are solely manufactured. Upward of 4000 tires have already been turned out and many hundreds of axles. Bottom casting is exclusively used, the tire ingots being cast in groups of four, the axles in groups of three double ingots, while for wire 8-inch parallel ingots in groups of four are cast. These latter weigh about 600 pounds, and are rolled down to 1 1/4-inch billets in one heat on a 12-inch train. The 8-ton plant has, for want of sufficient basic material, and during the alterations now making, only one of the three converters working on the system. This has to take its turn with the others, and from causes mentioned at the commencement of this communication, the production has not been so regular as that of its small neighbor. Here only rail ingots are cast, in groups of 8 or 10 inches square. These are then rolled direct in one heat, without previous forging or cogging.

In conclusion, I may remark that any comparisons made by me of the merits of the two great processes for making steel—i.e., the Bessemer and Siemens—would doubtless be considered prejudiced; but I believe it is now generally conceded that for soft steel the latter carries off the palm, and this I attribute to the complete elimination of the silicon, to the mixture of different brands of pig, and to the absolute certainty with which the carbon in the finished steel can be controlled.

A paper which was looked forward to with more than ordinary interest, was that of Herr R. Pink, an engineer of the Hoerde Works, Westphalia.

We regret to say that those who have followed the literature of the subject closely this paper must be a disappointment. As far as analyses, tests and working details are concerned, nothing is given which was not fully presented to the readers of *The Iron Age* as early as January 22d, when we gave a review of the facts published by Herr Massenez. Herr Pink states that the Hoerde Company do not feel justified in publishing later details, which are being prepared for publication by a number of eminent metallurgists. One subject, however, is referred to, the report of which is worthy of being quoted in full, as follows:

Ore. No. 1. No. 2.
Elba..... 0.025 0.03
Marble..... 0.025 0.04
Somorrostro..... 0.025 0.025
Mokta..... 0.025 0.025
Tagus..... 0.025 0.048
Sounah..... 0.025 0.048

To insure that the pig iron was not mixed, samples were taken in each case when the metal was melted, and it was found uniform throughout.

M. Pourcel, at the last meeting of the Institute, stated that steel made from ore charges was unsuitable for plates. I can only say that the whole of these charges were manufactured into plates which had a breaking strain of from 27 to 29 tons per square inch, and elongated from 25 to 30 per cent. in 8 inches.

The pig iron most suitable for the open-hearth process (the sulphur and phosphorus being low) is that containing the least carbon and silicon. In the first place it contains a higher percentage of iron, and in the second, it does not require to be so long in the melting furnace before the metal is completely decarburized. Moreover, pig iron containing a large percentage of silicon, although it is all oxidized, invariably yields inferior steel. Why, I cannot say. More than 0.50 per cent. of manganese is objectionable, not only on account of the delay it causes, but because of the destruction of the silicon bottom by the formation of a fusible silicate of manganese. It is not only difficult that can be explained that a metallurgist, dealing with what may be called this mysterious compound steel, has to contend with, but also those which our present knowledge fails to account for. From long experience, I find that steel from different brands of hematite pig iron, chemically the same and made from the same ores, not only act differently in the furnace, taking more time, cutting the bottom, &c.

but in their finished state show a marked difference in their tensile and other tests. At first I was inclined to impute this to some defect in the mode of analysis, which failed to detect minute traces of elements, possibly derived from the coke or limestone used in their manufacture; but, in contradiction to this, I found that two cargoes of pig iron of different brands, both of which worked in a most unsatisfactory manner by themselves, gave, when mixed in equal proportions, results which were everything that could be desired. Others invariably gave good results *per se*, and, by mixing as many brands as possible, uniform results may be obtained. Experiments made at Landore show that no metal added to the bath of steel has the slightest effect, as far as the elimination of sulphur is concerned, and manganese is the only metal that will counteract it. Manganese has been described as a cloak for bad material. No doubt this is so to a certain extent, but, at the same time, its presence is indispensable in steel made by an oxidizing process. An ingot from a charge composed of Swedish pig iron and puddled bar made from the best hematite pig containing no manganese, will break into pieces at the first blow of the hammer, while a similar ingot, containing 0.08 per cent. manganese, will forge.

Tungsten alloyed with steel appears to harden without detracting from its toughness, but I doubt much whether the advantage gained compensates for the cost. Tungsten is also said to add to the magnetic power of steel, but of this I have no experience. In steel supplied to a Cornish mining company from Sheffield for borers, I found as much as to per cent. of tungsten. As far as fracture goes, this alloy is the most beautiful of all steels.

I have no experience as to the effect of tin on steel, but a bar of iron made from tin-plate shearings, from which the tin had been to a considerable extent removed, was extremely red short and unworkable; the amount of tin contained in this sample was 0.15 per cent. Lead and zinc, when added to a bath of steel, are simply volatilized, without producing any effect except that of half choking the melters.

Chromium gives great hardness, but at the same time causes brittleness, and may be put down as useless. The average life of bottoms, either rammed round pins or clay tuyeres, reaches about nine charges, and with bricked ones better results have only been obtained occasionally. Converter linings last, including the necessary patching, from 90 to 130 charges. Patching consumes about 50 per cent. of the amount of bricks required when first lining up, so that a 3-ton converter requires for, say, 120 charges, or a total production of 400 tons, as near as possible 4500 basic bricks.

The irons now used at Hoerde are their own rejected foundry No. 3, foundry scrap, a half-mine forge pig, the white forge pig of Messrs. De Wendel, Messrs. Metz, of Luxembourg, and that of the Ilseide Company, in the province of Hanover. This latter contains as much as 3 per cent. of phosphorus and about 2.5 per cent. of manganese. The 3-ton plant produces about 40 tons daily, very nearly the same as when working the same converters acid lined. The shop is so cramped for room that rapid working is an impossibility. In this department, tires, axles, plates and material for wire are solely manufactured. Upward of 4000 tires have already been turned out and many hundreds of axles. Bottom casting is exclusively used, the tire ingots being cast in groups of four, the axles in groups of three double ingots, while for wire 8-inch parallel ingots in groups of four are cast. These latter weigh about 600 pounds, and are rolled down to 1 1/4-inch billets in one heat on a 12-inch train. The 8-ton plant has, for want of sufficient basic material, and during the alterations now making, only one of the three converters working on the system. This has to take its turn with the others, and from causes mentioned at the commencement of this communication, the production has not been so regular as that of its small neighbor. Here only rail ingots are cast, in groups of 8 or 10 inches square. These are then rolled direct in one heat, without previous forging or cogging.

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M. Pourcel, at the last meeting of the Institute, stated that steel made from ore charges was unsuitable for plates. I can only say that the whole of these charges were manufactured into plates which had a breaking strain of from 27 to 29 tons per square inch, and elongated from 25 to 30 per cent. in 8 inches.

The pig iron most suitable for the open-hearth process (the sulphur and phosphorus being low) is that containing the least carbon and silicon. In the first place it contains a higher percentage of iron, and in the second, it does not require to be so long in the melting furnace before the metal is completely decarburized. Moreover, pig iron containing a large percentage of silicon, although it is all oxidized, invariably yields inferior steel. Why, I cannot say. More than 0.50 per cent. of manganese is objectionable, not only on account of the delay it causes, but because of the destruction of the silicon bottom by the formation of a fusible silicate of manganese. It is not only difficult that can be explained that a metallurgist, dealing with what may be called this mysterious compound steel, has to contend with, but also those which our present knowledge fails to account for. From long experience, I find that steel from different brands of hematite pig iron, chemically the same and made from the same ores, not only act differently in the furnace, taking more time, cutting the bottom, &c.

The small 3-ton converters at Hoerde can be much more rapidly manipulated than the larger 8-ton vessels, and the delay in taking the tests is not half so great. Delay is the cause of more blocking up than anything else. To avoid this, there appears as the very best remedy exceedingly rapid manipulation of the whole plant and the reduction of the necessity of taking many, or any tests during the charge. When working with a perfectly known quantity of phosphorus and silicon, the former can be reduced to 0.07 or 0.08 without even once testing. Again, when the bottoms do not stand, the blocking up is very bad. This is no doubt caused by the insufficient fluxing of the dolomite loosed from the bottom. The slag, being then thicker, adheres more easily. In all cases, the heat of the charges has been greater and the blocking up less when using the highest obtainable blast pressure.

Great speed in working, together with large ladles that allow of rapid teeming, combined with a sufficiency of phosphorus and manganese, as also good bottoms, with a minimum duration of 16 charges, and the use of fire-brick zones at the points most liable to incrustation, appear to be the solution of this inconvenience. Bottoms cause trouble principally on account of their irregularity, giving at one time 16 charges, and then, again, only four or five. The undoubted cause of this is the insufficient calcination of the dolomite, which, when exposed to the influence of the atmosphere after being ground, or even when grinding, rapidly absorbs moisture. It must be admitted that, if the causes of bad bottoms are as above stated, with more experience and care in preparing them they ought all to go up to the highest figure here given.

The average life of bottoms, either rammed round pins or clay tuyeres, reaches about nine charges, and with bricked ones better results have only been obtained occasionally. Converter linings last, including the necessary patching, from 90 to 130 charges. Patching consumes about 50 per cent. of the amount of bricks required when first lining up, so that a 3-ton converter requires for, say, 120 charges, or a total production of 400 tons, as near as possible 4500 basic bricks.

At the Rhenish Steel Works, in Ruhrort,

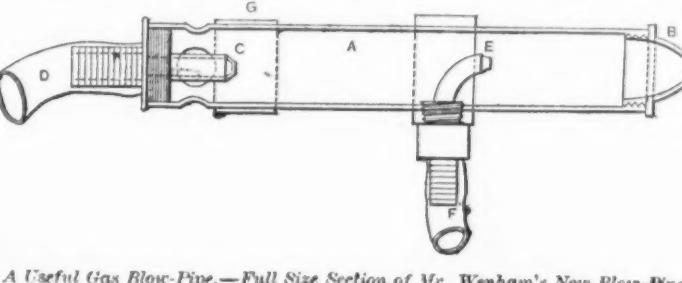
the process is worked even more successfully than at Hoerde, and the following German firms have arranged for working or are working under this system: Messrs. De Wendel, Messrs. De Diedrich, De Gennathen Brothers, Stumm Brothers, the Lothringen Iron Works at Arns, on the Moselle; the Barbach Iron Works, the Rothe Erde, near Aachen; the Bochum Company, the König Marien Works in Saxony, and others.

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A more detailed paper on the same subject was read by Messrs. C. B. Holland and A. Cooper, of Sheffield, giving recent experience with the Thomas process in England. We shall make room for it and the interesting discussion to which it gave rise in the next issue of *The Iron Age*.

Useful Gas Blow Pipe.

Mr. F. H. Wenham, the well-known English scientist, who has made many improvements in various kinds of mechanical apparatus, has recently devised a new form of gas blow-pipe, which promises to be of very



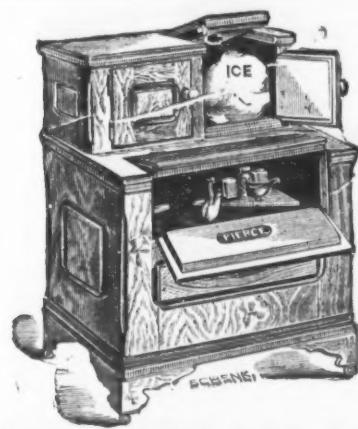
A Useful Gas Blow-Pipe.—Full Size Section of Mr. Wenham's New Blow-Pipe.

great value. If the mouth of an ordinary blow-pipe is made use of, having an orifice in the jet large enough to act upon the entire flame of an ordinary gas burner, the resulting flame will be ragged and noisy. With such a blow-pipe it is impossible to obtain the immovable or pointed flame, or pencil, which is absolutely required for many operations, especially those of soldering and lead burning. In addition to these objections, the large size of the nozzle of the blow-pipe causes such an expenditure of air that a continuous blast cannot be maintained from the mouth, and it is necessary to stop repeatedly in order to fill the lungs. If a bellows is used for this purpose, the motion has to be quite rapid, and there is a great waste of air.

The annexed cut represents Mr. Wenham's apparatus full sized. A is a brass tube, having a coned nozzle, B, at its free end. At the other extremity is a screwed plug, having an interior gas nipple, C, and an exterior plug for entering the end of the elastic tube D, for conveying gas from the nipple socket of an ordinary gas burner; L is a small jet pipe turning into the tube A at right angles, so that the orifice (which is very minute) shall direct a stream of air straight into the axis of the body of the instrument; F is an elastic tube about 18 inches long, provided at the other extremity with a trumpet-shaped mouthpiece of ebony or ivory, with a disk of 1 1/4 inches in diameter, in order that it may be held securely behind the lips in maintaining the strong pressure required for the blast. The jet at E is much too small to furnish the full supply of air required by the quantity of gas to be consumed; its action is entirely mechanical and inductive, by carrying forward the air and gas mixture formed in the tube or body A. At the base of this there are four orifices or cross openings, as shown. G is a split ferrule; this, when drawn back entirely or partly, closes the orifices, in order to proportion the supply of air to the amount of gas let on.

When there is a full supply of gas, and these orifices are quite open, with a strong mouth blast, the spire of flame issuing from the end at B will be 4 or 5 inches in length, perfectly stationary and quiet, and ending in a fine point. If the heat is too great for the purpose required, and the gas supply has to be turned down, the air-regulating ferrule G must also be drawn back, else the flame will be extinguished. When properly adjusted, either for maximum or minimum heats, this instrument in either case gives the required pointed flame, and as the orifice of the air jet at E is rather smaller than that generally used in an ordinary mouth blow-pipe, a continuous blast can easily be kept up without intermission, with the advantage that the flame can be traversed over the work in any direction, instead of the work being brought up, as in the case of an ordinary fixed flame.

Diameter of nozzle orifice at B, .23 inch; four openings at base, .23 inch; diameter of orifice



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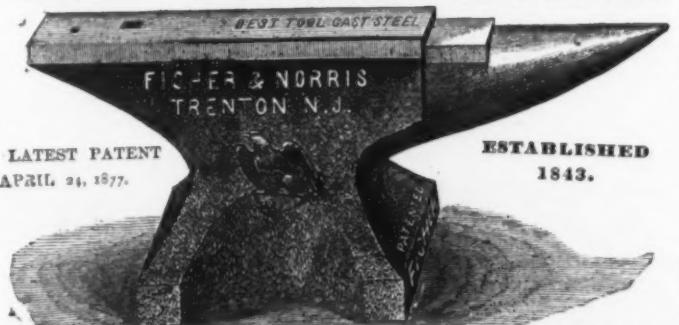
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The Iron and Coal Trades of Japan.

A number of commercial reports by Her Majesty's Consuls in Japan have been issued, and they contain incidentally some information of interest to our readers. From Hakodate we learn that the working of the coal mines at Porome, at a distance in a southeast direction of 70 miles from Sapporo, has been started. Engineers from America are laying down a tramway from there to the mouth of the Techari River, and as the sand banks there are a great drawback, engineers have arrived from Holland in order to endeavor to overcome that obstacle. At Hakodate hydraulic works are to be commenced forthwith, to supply the town with water. Evidently they are to be on an extensive scale, for the cost is \$140,000. The water is from a spring on the hill, some four or five miles from Hakodate. There is to be a large reservoir on the brow of Hakodate Hill, and tanks all over the town, at a distance of 300 or 400 yards apart, to be used also in case of fire. With regard to the trade of Hiogo and Osaka, we note that the imports of metal show the large increase of \$163,600, the value of the imports in 1878 being \$391,800, as against \$223,200 in the previous year. Iron continues to be the most important item of metals. Deliveries for the year 1878 were 70,337 piculs, valued at \$238,000, as compared with 34,480 piculs, valued at \$175,600, in 1877. This gives an increase in quantity for the year 1878 of 24,857 piculs and in value of \$62,400. This increase is, to a certain extent, accounted for by a remarkable development of the importation of old wire rope and old iron chain, &c. Up to the end of 1877 the quantity of iron of these two classes which was imported was comparatively insignificant, but during 1878 old wire rope alone was imported to the extent of 18,000 piculs. The iron in question is principally used for nail making, the Japanese now preferring nails thus made to those manufactured from ordinary nail rods. This preference has naturally caused a decline in the value of nail rod iron, and a consequent decrease in the importation of this article. Lead also exhibits a large increase; the value of the importations in 1878 being \$99,400, and in 1877 only \$11,600, and the quantity imported in 1878 nearly three times as much as that in 1877. Prices ruled lower during the past year, a fact which explains the increase in value not being in the same proportion as the increase in quantity. It is said that in consequence of the scarcity of production and resulting high price, the only market for Japan copper (beyond a small quantity to China) exists in India, whither, as a mode of remittance, it is shipped to Hong Kong. We further learn from Hiogo that the Kobe Iron Works were first opened for business in June, 1873. These premises are situated on a plot of land about three acres in extent, on the east side of the bay, about a quarter of a mile from the Foreign Concession. Having water frontage, a wharf, and sheer legs for lifting heavy weights, vessels drawing 18 feet of water can come alongside the wharf to discharge or load heavy machinery, boilers, &c. Marine and general engineering work, shipbuilding and repairing, boiler making, iron and brass founding, &c., are all carried on with private capital. Repairs to a steamer's machinery not requiring the use of a dock, can be effected at these works under the superintendence of a complete staff of European foremen.

With reference to the trade of Kanagawa, we note that the imports of metal amounted to \$1,352,312 in 1878, against \$1,157,078 in 1877. The metal trade there is almost exclusively in the hands of the native merchants, who, by combining, manage to supply themselves at pretty nearly their own prices. The effect of this combination is particularly felt in the case of damaged iron sold to arrive, as the importer is compelled to submit to the rate of depreciation which these men think fit to establish. Iron is set down at \$744,719, being an increase of \$123,000 on the returns of the previous years. The returns do not give the quantity, but the Chamber of Commerce record the deliveries as follows:

Piculs.	Flat and round	34,25
Flats and rods	21,257	21,257
Fig.	8,040	8,040

While for sizes and qualities of bars, sheets, &c., suiting the immediate wants of the buyers, a fair price, giving a small commission on home cost, has been obtained, unsuitable sizes and qualities have almost been unsaleable at any price, and the stock of flat and round iron on hand at the end of the year was almost exclusively composed of undesirable parcels, probably shipped by manufacturers to relieve their stocks at home when the production has been carried on at a loss, as shown by the number of failures in the iron trade and by the number of workshops closed during the year. Nail rods opened with a stock of 6633 piculs. Quotations were as follows: Assorted belled from \$2.60 @ \$2.90 in January to \$2.30 @ \$2.70 in December. Small sizes likewise receded from \$3.35 to \$2.75 @ \$2.95 at the end of the year. The stock on the 31st of December was 11,530 piculs. Pig iron and pig lead are chiefly imported for the Japanese government use. The latter article has fallen off from \$202,030 in 1877 to \$148,705 in 1878. Prices opened at \$7 @ \$7.25 per picul, declining gradually until August, when they touched \$5.75, but about the end of the year recovered to \$5.90. These variations followed somewhat the course of the home market, but, taken all round, importations must have shown a loss on cost. Tin plates show an increase of \$21,067. The demand for this article would be doubtless much greater if the numerous tin shops, which are now seen all over the country, had to manufacture their tinware from tin plates, which is not the case, as an enormous quantity of old tin kerosene cases are thrown into the market and disposed of at a very cheap rate. Prices for plates opened at \$5.60 @ \$5.80 per box, and following the course of the home market, they fell to \$5.30 @ \$5.50 at the end of the year. These, as a rule, were about the equivalent in cost.

Of the mineral products of the district of Nagasaki, coal occupies by far the most important place. Of the coal mines at present worked, the chief is that of Takashima. The net output of this mine during 1878 was 141,772 tons, of a value, in Nagasaki, at say \$4.79 per ton, of \$679,083. The whole of this coal is brought into Nagasaki harbor in junks or lighters, towed by a steam tug. The coal is shipped from here to other ports in Japan to Shanghai and other places. The following is a statement showing how the above output was disposed of within the year:

Tons.	Sales in Nagasaki and other Japanese ports	63,714
Sales in foreign ports (Shanghai, &c.)	57,401	57,401
In stock	21,057	21,057

Total 141,772

The principal other coals which find a sale on the Nagasaki market are, in the order of their value, those of Karatsu, Taku, Mike, Snabuku. We are not in a position, however, to give particular information with respect to any of the mines where these are produced, with the exception of Mike, situated at the head of the Shimabara Gulf. The total output of the Mike mine, in 1878, was 81,035 tons, of which there were transported from the mine to Nagasaki, say, 5086 tons.

Tons.	To the port of Kuchino-su (on the peninsula of Shimabara) for shipment to Shanghai, or sale at Kuchino-su	7,935
To other places in Japan	11,513	11,513
Or was sold at Mike	36,501	36,501

Total 81,035

It will be seen that of this coal only a part is sent to Nagasaki for shipment. The following statement will show how the output of this mine for the year was disposed of:

Tons.	Sales in Japan, including Nagasaki	64,761
Sales in Shanghai	8,157	8,157
In stock in several places	8,117	8,117

Total 81,035

The future of the trade of Nagasaki, to all appearance, depends much on the development of coal mining in the district. The difficulty at present in the way of a greater extension of mining operations seems to be the want of sufficient capital on the part of the mine proprietors and the want of necessary security to attract foreign capital to this enterprise. Among the other mineral products of the district, sulphur is about the only one which deserves special mention. Copper, iron, antimony and other ores occur, but are not produced in any great quantity. Lime is also found. From Niigata, we learn that the Akatani coal mine, situated about 2½ miles from the Aganakawa, is worked with indifferent success. The coal is excellent, but enterprise does not at present seem to turn that way, and the amount annually raised is small and merely to supply local demand. The coal mentioned as having been discovered in the island of Yeido, in Keishin, has been examined by an Englishman on board the "Kello-Maru." He says it is very good, and resembles the best English coal. Japan produces little coal so good, he says. It is hoped that some mercantile firm will initiate some plan of exporting this coal, and ascertaining the amount which can be produced. Coal has been discovered on the coast of Keishin, at Chinato. On examination, the sample appeared to have been exposed to the weather, and was deficient in oily quality; but if care were taken in mining, it would doubtless prove of good quality. The Corsicans have an objection to digging on their hills and opening up mines, no doubt because there are few hills which do not contain graves. Until this custom has changed no mining development can be expected.—*Colliery Guardian*.

May 20, 1880.

THE IRON AGE.

Trade Report.

Office of THE IRON AGE.
WEDNESDAY EVENING, May 19, 1880.

During the past week the financial markets have been active.

The importations of specie and bullion for the week ending May 14 amount to \$126,458, including \$4870 gold and \$121,458 silver. Since the 1st of January the importations will reach \$3,323,286, consisting of \$1,247,284 gold, \$2,074,923 silver and \$1079 brass and copper coin. From the 1st of August, 1879, to May 14, 1880, there has been a total importation of \$81,330,918, of which \$76,505,565 is gold and \$4,824,323 silver.

The ruling rate for call loans in the money market has been 4 @ 5 per cent., exceptional loans being made as low as 3 per cent. and as high as 6 per cent.

Government bonds have been strong and prices have advanced a fraction. The entire bond offerings to the Treasury to-day were \$4,273,000. The amount accepted was \$3,000,000. Railroad investments have been strong.

The stock market was weak until Friday, and prices declined 1/4 @ 6 per cent. On Friday there was an advance of 1/2 @ 4, but a reaction set in on Saturday afternoon and the prices of the leading stocks reached the lowest point for many months, the decline for the week being 1/4 @ 16 1/2 per cent. To-day there has been a steady recovery, and at the close of business this afternoon the market was strong. The principal dealings have been in the coal shares, Erie, Kansas and Texas, Wabash and Pacific, Pacific Mail, Western Union Telegraph, Lake Shore and New York Central.

The bank return shows a gain of \$4,170,475 in surplus reserve, which now stands at \$10,238,625, against \$10,303,625 at this time last year, and \$14,128,775 at the corresponding period in 1878. The loans show a loss this week of \$2,563,500, the specie is up \$2,886,500, the legal tenders are increased \$1,072,200, the deposits other than United States are up \$2,752,900, and the circulation is decreased \$74,500.

The following is an analysis of the bank totals of this week compared with that of last week:

	May 8.	May 15.	Comparisons.
Loans	\$23,157,700	\$26,574,200	Dec. \$2,563,500
Specie	53,291,500	56,278,500	Inc. \$2,886,500
Legal T'd'm . . .	17,257,100	19,229,300	Inc. 1,072,200
Total reserve . . .	70,628,600	75,527,300	Inc. 2,752,900
Deposits	258,333,000	261,075,300	Inc. 2,752,900
Reserve required . . .	64,580,750	65,258,975	Inc. 588,225
Surplus	5,067,350	10,388,125	Inc. 4,320,775
Circulation	25,378,900	26,488,400	Dec. 74,500

The foreign trade movements at the port of New York since our last issue are shown in the following tables:

	Imports
For the week ended May 15 :	
Dry goods	1878.
General mds..	1879.
Total for week	1880.
Prev. reported.	1880.

Included in the imports were items of merchandise valued as follows:

	Quantity.	Value.
Copper	133	\$3,305
Cutterly	46	210
Pins	34	3,308
Guns	66	12,170
Ironware	10	3,049
Iron, hoop, tons	10	18,378
Iron, pig, tons	12,133	22,893
Iron, sheet, tons	232	15,387
Railroad bars	11,151	71,700
Iron—cotton ties	1,200	1,428
Iron ore, tons	2,993	1,046
Iron, other, tons	10,067	26,474
Iron goods	14	10,720
Nails	17	4,597
Needles	3	89
Old metal	298	2,045
Platina	3	2,045
Plated ware	4	332
Percussion caps	32	2,915
Steel	10,488	77,468
Silverware	108	1,872
Tin, bxs	37,858	169,376
Tin, 3,141 slabs : lbs.	214,108	47,054
Teasels	7	284
Wire	3,047	26,004
Zinc	166,548	5,930
Bronze goods	108	600
Bronzes	15	6,322
Chains and anchors	14	2,768
Padlocks	34	2,128

	Exports, EXCLUSIVE OF SPECIE.
For the week ended May 15 :	
Dry goods	1878.
General mds..	1879.
Total for week	1880.
Prev. reported.	1880.

Included in the exports were items of merchandise valued as follows:

	Quantity.	Value.
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Bronze goods	108	600
Bronzes	15	6,322
Chains and anchors	14	2,768
Padlocks	34	2,128

	Exports, EXCLUSIVE OF SPECIE.
For the week ended May 15 :	
Total for the week	1878.
Previously reported	1879.
Total since January 1	1880.

Government bonds at the close were strong at the following quotations:

Bid.	Asked.
Alton and Terre Haute	14
American District Telegraph	14
Atlantic and Pacific Telegraph	78
Boston Air Line Preferred	40 1/2
Burlington and Quincy	110
Central Southern	40 1/2
Central Arizona	75
Col. Chicago and Indiana Central	11 1/2
Clev. Col. Cin. and Indianapolis	70
Climax	2
Chicago, St. Paul and Minn.	40 1/2
Chicago and Alton	106
Chicago, St. Louis and New Orleans	120
Central Pacific	64

The following were the closing quotations of active shares:

Bid.	Asked.
" Pref.	60
American District Telegraph	78
Atlantic and Pacific Telegraph	38
Boston Air Line Preferred	46
Burlington and Quincy	117 1/2
Central Southern	49 1/2
Central Arizona	75
Col. Chicago and Indiana Central	11 1/2
Clev. Col. Cin. and Indianapolis	70
Climax	2
Chicago, St. Paul and Minn.	50
Chicago and Alton	107
Chicago, St. Louis and New Orleans	26
Central Pacific	67 1/2

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Chicago, St. Paul and Minn.	50
Chicago and Alton	107
Chicago, St. Louis and New Orleans	26
Central Pacific	67 1/2

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending May 18, 1880:

Danish West Indies.

	Quan.	Val.
Glassware, cs.	12	\$371
Hdw., cs.	5	157
Mf. iron, pkgs.	5	35
Nails, kegs...	25	116
Ptms., gals...	6138	695

Dutch East Indies.

	Ptms., gals.	val.
Cronstadt.	6300	8,430

Ptms., gals.

	Quan.	Val.
Clofery, cs...	8	\$35
Bells...	1	35
Wire, spools...	260	3,445
Zinc, roll...	47	47
R. R. cars...	8	47
R. R. cars...	32	16,350
Chains, cks...	4	218
Hdw., pkgs...	12	363
Sew. ma., cs...	5	153
Tinware, cs...	3	49
Yel. metal, cs...	3	49
Nails, kegs...	12	52

Brazil.

	Ptms., gals.	val.
Dutch West Indies.	6300	8,430

Hamburg.

	Quan.	Val.
Lub. oil, bbls.	550	2,958
Mach. oil, gal...	610	610
Machy., cs...	35	5,092
Nails, cs...	42	633
Spelter, slab/s...	4,000	4,000
Glasswre, pgs...	32	377
Tinware, pgs...	5	63
Plattdw., gals...	203	134
Met. goods, cs...	8	196

Japan.

	RR. cars, pgs.	val.
Machy., pkgs...	112	15,663
Scalae, pkgs...	88	2,000
Locomo., pkgs...	59	17,200
Cutterly, cs...	53	1,454
Glasswre, pgs...	13	58
Pump...	1	53
Ag. imp., pkgs...	46	575
Mach. oil, gals...	203	134
Nails, kegs...	100	555

British Honduras.

	Sev. ma., cs.	val.
Ptms., gals...	6	86
Pumps, pkgs...	8	320
Ptms., gals...	2,333	279
Cutterly, cs...	2	42
Hdw., cs...	4	68
Glassware, cs...	18	226

British Guiana.

	Ptms., gals.	val.
Plattdw., gals...	12,000	1,237

Bremen.

	Glassware, bbls...	val.
Ag. imp., pkgs...	5	205
Copper, bxs...	3	600

Rotterdam.

	Hdw., cs...	val.
Ptms., gals...	23	688
Ptms., gals...	28,771	6,452
Ag. imp., pgs...	15	285
Lub. oil, bbls.	1473	493
Lub. oil, bbls.	995	8,035

Canada.

	Ptms., gals.	val.
Ptms., gals...	10,000	1,600
Coal, tons...	299	3,700

British North American Colonies.

	Ptms., gals...	val.
Iron ore, tons...	12	249
Hdw., cs...	32	545
Carbines, cs...	2	453
Mf. iron, pkgs...	12	543
Machinery, cs...	3	350

Hayti.

	Ptms., gals...	val.
Ptms., gals...	23	688
Ptms., gals...	28,771	6,452
Ag. imp., pgs...	15	285
Lub. oil, bbls.	1473	493
Lub. oil, bbls.	995	8,035

Canada.

	Ptms., gals...	val.
Ptms., gals...	10,000	1,600
Coal, tons...	299	3,700

United States of Columbia.

	Ptms., gals...	val.
Ptms., gals...	11,900	2,754
Tinware, cs...	6	148
Sev. ma., cs...	10	177
Mf. iron, pkgs...	67	707
Ptms., gals...	2	173
Silverware, cs...	1	750
Machy., pkgs...	11	443
Hdw., cs...	80	973
Mf. iron, pkgs...	17	351
Tin plate, bxs...	8	66

Venezuela.

	Ptms., gals...	val.
Ptms., gals...	81,000	4,926
Hoops...	44	100
Cutterly, cs...	1	44
Springa, bales...	4	685
Glassware, pgs...	50	1,910
Coal, tons...	14	307
Tin plate, bxs...	10	107
Machy., pgs...	19	404
Ptms., gals...	4	103
Glassware, cs...	10	2,090
Zinc, pgs...	25	2,945
Hdw., cs...	35	116
Nails, kegs...	74	900
Glassware, cs...	116	461
Sev. ma., cs...	9	154

United States of Colombia.

	Ptms., gals...	val.
Ptms., gals...	63,000	9,177
Coal, tons...	244</	

May 20, 1880.

THE IRON AGE.

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neighbor rather than enter the market. By this course their stocks have been reduced to a low point, as is plainly shown by the steady increase in business, which has now reached a quite satisfactory volume, despite the persistent hand-to-mouth policy. While it is true some parties have due on contracts sufficient Iron to last them for some time, they are the exception, and in nearly all such cases the greater part has yet to be made. The stocks in furnaces' and agents' hands is considerably less than one year ago. Production has been recently considerably curtailed, because of the unprofitableness of present prices, by the blowing out of a number of the largest furnaces in the West, and others will follow suit if prices do not improve. Reliable information places the stocks of foreign Iron at the Eastern seaports at a much smaller amount than currently reported. During the past week a good trade has been transacted, and for the first time in a long while we have no decline to chronicle, but are able to report an increased steadiness. As soon as the bottom is shown to have been reached and confidence is restored, the large traffic which has been delayed by the hitherto prevalent feeling of uncertainty will open up briskly throughout the many branches of the Iron trade. Consumers are beginning to express themselves freely in favor of an early reaction to reasonable prices, realizing that they will be directly benefited by an improvement. Conservative parties generally are averse to anything like extreme high prices, but our market to-day is so much below the cost of importing Foreign Iron, and of the actual average cost of producing native Iron, that an advance would be only reasonable in view of the prosperous condition of the country and the good omens for business this year from the promises of large crops, the great flow of immigration and other favorable causes. In the present condition of the market it is impossible to give correct quotations, and we therefore omit them.

LOUISVILLE.

Messrs. GEO. H. HULL & Co., under date of May 15, write us as follows : The market continues dull and depressed. Dealers are nearly all supplied for the time being, and show a determination not to buy until they are actually in want of Iron. Holders, on the other hand, show no disposition to press sales, and there are no transactions on which to quote the market. We quote nominally as below, on cash basis :

FOUNDRY IRONS.	
No. 1 Hanging Rock, Charcoal	\$32.00 @ 32.00
No. 2	30.00 @ 31.00
No. 2 Southern, Charcoal	30.00 @ 31.00
No. 2 " "	28.00 @ 29.00
No. 2 Hanging Rock, Stonecoal and Coke	30.00 @ 31.00
No. 2 " Hanging Rock, Stonecoal and Coke	28.00 @ 29.00
No. 1 Charcoal, Cold-short and Neutral	29.00 @ 30.00
No. 1 Stonecoal and Coke, Cold-short and Neutral	27.00 @ 28.00
No. 2 Stonecoal and Coke, Cold-short and Neutral	25.00 @ 26.00
No. 2 Manganese and Indiana Red-short and Neutral	33.00 @ 33.00
White and Mottled, Cold-short and Neutral	23.00 @ 24.00

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENGL., May 3, 1880.

THE SITUATION

in the iron trade of this country is most peculiar and eminently instructive to the "cool and impartial moralist." So far as the march of events has yet proceeded, we appear to have entirely lost all the apparent gains of last autumn and the beginning of this year, and we are now floundering about like stranded fish, in as bad a predicament as any we have ever known. The trade, as a whole, has become miserably and absurdly disorganized, and prices are literally "anyhow." Nobody professes to know precisely how we have been landed in this dilemma, but the fact of its existence is indisputable. The break came upon most of us suddenly and without any especial warning. Like a thief in the night, it seems to have crept over the land unnoticed during the stormy interval when we were giving electioneering matters the preference over business. Here is our punishment, at all events, and we have to face it and take our dose "without winking." The very wise ones, who are always more knowing than their neighbors, now tell us in trumpet tones that they had always foreseen the coming trouble, and that they were not deceived by the bubble which was blown during the autumnal and winter months. We admit their prescience, if the admission will comfort them, but we dispute the accuracy of their reasoning when they assure us that all this could easily have been avoided. How could it have been otherwise? Who was to restrain hard-up ironmasters from endeavoring to secure some of the orders which were afloat? Who was to keep down the individual or aggregate production? Who could keep back the speculators—or, indeed, who was able to plainly distinguish between the man who bought on speculation and the bona fide consumer? No one could have done any of these things, and it is, therefore, absolutely idle and absurd to now pretend that such should, or ought to have been, the case. It is always easy to be wise after the event, and it is often possible to be fairly sagacious before it. I have no doubt whatever that fully 80 per cent. of all those who were concerned in all branches of the iron trade suffered the worst all the time the "boom" lasted. They suspected that the mainstay of our revival was the American demand; but, notwithstanding, they individually resolved to try their luck, and, as a matter of history, many of them made money by their adventures. In the long run they overdid it, and killed the goose that had been laying the golden eggs; yet I have not the slightest doubt that, were given the same opportunity again, every one of them would take the same course of action. Their arguments are fair enough. They can

HOT BLAST CHARCOAL.	
Missouri	\$31.00 @ 34.00
Southern	28.00 @ 30.00
Hanging Rock	30.00 @ 31.00

COKE AND COAL.	
Missouri	None offering
Southern	26.00 @ 28.00
Ohio	26.00 @ 28.00

MILL IRONS.	
Cold-short	24.00 @ 26.00
Red-short	30.00 @ 31.00

CAR WHEEL IRONS.	
Missouri	45.00 @ 48.00
Southern	50.00 @ 52.00
Ohio	50.00 @ 55.00

IRON ORE—NOMINAL	
For fix	10.00 @ 12.00
For furnace	6.50 @ 7.50
Brown Hematites	no market.

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows under date of May 17 : More inquiry and better tone to the market. I quote as follows :

Scotch Pig Iron, according to brand 24.00 @ 28.00
Am. Scotch Pig Iron " 31.00 @ 33.00
American No. 1 " 29.00 @ 33.00
" No. 2 " 27.00 @ 29.00
" No. 3 " 26.00 @ 29.00
Am. Mot. and White " 24.00 @ 27.00
Cold-blast Charcoal " 42.00 @ 45.00
Warm-blast Charcoal " 32.00 @ 35.00
Old Rails " 25.00 @ 27.00
Wrought Scrap No. 1 " 22.00 @ 24.00
Cast Machinery, No. 1 " 20.00 @ 22.00
Horse Shoe, Redhot Bar, Stand'd. " 29.00 @ 31.00
Horse Shoes, Tredgar. " 4.50
Mule " 5.00
Old Dominion Nails, (standard size) " 3.75
For lots of 200 kegs, 10¢ per kg less.

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports the following, under date of May 17 : Trade rules remarkably quiet; nothing doing only for immediate wants, and in very limited quantities :

Ref. Bar Iron, 1 to 6 by 3 to 12 ...	10 lb 2 1/2 @ 30¢
" 1 to 4 1/2 by 1 1/2 to 2 ...	10 lb 2 1/2 @ 30¢
" 1 to 2, Round	10 lb 2 1/2 @ 30¢
and Square	10 lb 2 1/2 @ 30¢
Hoop Iron, 1/2 wide and upward.	4 lb 6 1/2¢
Band Iron, from 1/2 to 4 in. wide.	3 1/2 lb 3 1/2¢
Horse-shoe Iron.	4 1/2 lb 4 1/2¢
Norway Nail Rods.	6 1/2 lb 6 1/2¢
Black Diamond Cast Steel.	12 1/2 lb 12 1/2¢
Machinery Steel.	8 lb 9 1/2¢
Cast Spring Steel.	10 lb 10 1/2¢
Common Horse Nails.	8 lb 12 1/2¢
Perkins' Horse shoes, 10 kg of 100 lbs.	6.12 1/2¢
Mule shoes	10 g 8 7 6
Putnam Horse Nails.	10 g 22 23 24 25 26¢
Globe Horse Nails.	10 lb 21 22 23 24 25¢
Globe Rail Spikes.	3 1/2 @ 4 1/2¢

Less list discount to the trade.

R. C. HOFFMAN & Co., Iron and Commission Merchants, report the Pig Iron market as follows under date of May 17 : We have but little change to report in the Iron market. Sales are light and confined to immediate wants, with prices ranging about as follows :

Baltimore Charcoal Wheel Iron	\$8.00 @ 10.00
Virginia	8.00 @ 10.00
Anthracite No. 1	27.00 @ 29.00
No. 2	26.00 @ 27.00
No. 3	25.00 @ 26.00
" Mottled and White	23.00 @ 25.00
Charcoal C. B. Blooms	7.00 @ 7.50
" Billets	7.00 @ 7.50
Refined Blooms	6.00 @ 6.50

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	50.00 @ 55.00
Alabama and Georgia, Cold-blast	13.00 @ 15.00
Kentucky, Cold-blast	43.00 @ 45.00

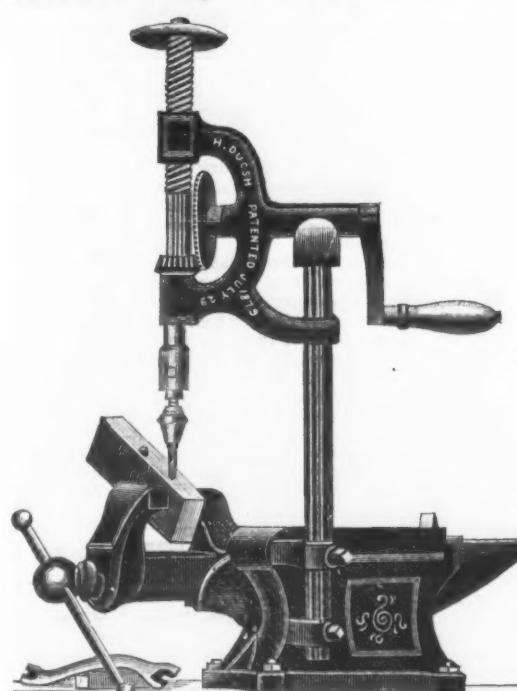
W. B. BELKNAP & Co., Iron and Steel merchants, Nos. 113 and 115 West Main street, report to us as follows, under date of May 15 : There is little encouraging to note. Each week brings only further decline in Iron and most of its products, and the decline is more precipitous, if anything, than the advance was slight. No matter how low the price fixed by the mills, holders will shade it till stocks are cleaned out or reduced so low that there will be no pressure to get rid of them. Stocks of Pig, Bar Iron and Nails are not mythical in this part of the country, whatever they may be elsewhere. Some furnaces that we know of are piling up Pig, while the mills have stocks of Bars that are going out only in the veriest dribs and drabs, and the depressed feeling is deepened by the figures of large imports which daily confront us in the papers. We are settling down to the conviction that it must be a matter of time—and only time can work the remedy. Those ever prospective "large buyers who must soon come into the market" to give it a boost are not very apparent to us even in the remote horizon. The diminished size of their orders will make them unrecognizable when they do come. Bar, nominally, 2.50¢; Nails pretty firm at \$3.25. Scrap still dull, though the amount offering has fallen off. Hardware going out in assorted small lots.

NEW ORLEANS.

Messrs. MINNIGERODE & Co., dealers in Railway Supplies, 61 St. Charles street, write as follows under date of May 15 : Our market for the past week has shown no improvement in prices, but trade at the decline has been more active. With regard to road material, the extreme differences which for the past few weeks have existed between buyers and sellers, appear to be becoming gradually lessened. This change is very perceptible day by day, and, we think, the near approach of an active trade at steady, if reduced, prices. The lower grades of Scotch Pig, in lots of not less than 100 tons, have sold during the present week at \$22. ex. ship. We report several sales of Old Rails, aggregating about 700 tons, at prices ranging from \$27 @ \$28, f. o. b. here. New Iron has been in fair demand, and is selling at about 2 1/2 rates, ex. store. In railway track supplies we quote : Fish Plates, 2 1/2¢; Bolts and Nuts, 3 1/4¢; Spikes, 3¢, with fair demand. We hear of no sales of Iron or Steel Rails during the week.

ST. LOUIS.

Messrs. CARD & HOFFMAN, Pig Iron and Iron Ore Merchants, 417 Pine street, write as follows

ANVIL, VISE AND DRILL.

This machine was first made by a practical mechanic for his own use, and to meet a want which nothing in the market would fill. It was so highly regarded that when it was made it was intended to get it patented and manufactured for the market. When it was brought to our attention we saw at once its great utility, and bought the exclusive right for the whole United States. We believe it will come into general use as fast as its merits become known. The anvil is 4x8 inches, and height 6 inches. Width of vise jaw, 3½ inches; steel drill press with adjustable chuck to hold ½ inch drills, and all smaller sizes. The article to be drilled can be held firmly in the vise, set to the required angle, or if it is too large for the vise it can be drilled on the anvil. The drill may be removed when not in use. Price for the whole, \$18. Weight, 80 pounds. The vise and anvil are complete without the drill, and are sold for \$12. Weight, 60 pounds. All hardware dealers, blacksmiths, and carriage and wagon shops, it is worth much more than its cost. Farmers can do with it many jobs which otherwise would have to be sent to the shops. All hardware dealers who do not keep them in stock will furnish them on demand, or we will send them on receipt of the price.

MILLERS FALLS CO.,
74 CHAMBERS ST., NEW YORK.

HEATON & DENCKLA,
Hardware Commission Merchants,
507 Commerce Street, Philadelphia.

E. & G. BROOKE'S "Anchor Brand" Nails, Brads, Spikes, &c.
MALLORY, WHEELER & CO.'S Door and Pad Locks.
UNION MANUFACTURING CO.'S Butts.
AMERICAN SCREW CO.'S Screws.
D. R. BARTON TOOL CO.'S Edge Tools, &c.
FRANCE'S Shutter Holders.
Anti-Window Rattlers, Brass and Nickel-Plated.
WESTERN FILE CO.'S Cast-Steel Files.
AMERICAN SHEAR CO.'S Shears and Scissors.
H. M. MYERS & CO.'S Shovels, Spades and Scoops.
STEELE & SONS' Wrought Handle Sad Irons.

Also a large line of Heavy and Shelf Hardware.

F. HABERMAN,
MANUFACTURER OF
Stamped, Japanned and Plain
TINWARE,
AND THE CHEAPEST AND BEST
OIL AND GAS STOVES
IN THE MARKET.

NOTE.—These Stoves are made under license from the Kerosene Lamp Heater Co., the royalties are paid by me, and the Stoves have license tags attached, so that dealers may purchase and sell them with perfect safety.

SEND FOR CIRCULARS.

294 PEARL STREET, NEW YORK.

THE SWIFT MILL.

ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship off the very best. We make more than 30 styles.

ALSO LANE'S PORTABLE COFFEE ROASTER
Will roast 30 to 40 lbs. at once, and can be used as a stove at other times. Send for descriptive list to Manufacturers.

LANE BROS., Millbrook, N. Y.

Also sold by leading wholesale houses.
Our agents, Graham & Haines, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.



Bemis & Call Hardware & Tool Co.
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PHILADELPHIA "STAR" BOLT WORKS.

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Carriage & Tire Bolts. Star Axle Clips, &c.
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**NATIONAL
Horse Nail Co.**

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FINISHED
(BRIGHT OR BLUED)



As Iron
Iron and Tung
Williams, Long
Wood Alan & ON, and are guaranteed to be equal to
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No. 97 Chambers St., New York

The Oldest Shot Tower in America.
FOUNDED JULY 4, 1808.

**THOMAS W. SPARKS,**

Manufacturer of
SPARKS'

American Chilled Shot,

Rivaling the English and all Others.

**STANDARD DROP & BUCK SHOT
AND BAR LEAD.**

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**St. Louis Malleable Iron
Company,**

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HENRY M. FILLEY, JOHN D. FILLEY,
President, Secretary.

MANUFACTURERS OF

**Malleable and Gray
Iron Castings,**

GENERAL HARDWARE, &c.

W. G. FOSSICK,
Engineer and Iron Agent,
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Iron and Steel Rails,

Bars, Angles, Plates,

Pig Iron & Puddled Bars.

Old Hails, Scrap Iron, Steel Rail Ends

c. f. i. American, or f. o. b. European ports.

Contracts negotiated on the most favorable terms.

Bankers: Barnetts, Hoares & Co., London.

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**STANDARD
SCALES
AND
TESTING
MACHINES**

Patent "Self-Adjusting" Railroad Track Scales, pronounced "the most accurate and durable" over all competitors at World's Fair, 1876. In use by Pennsylvania, Lehigh Valley, Baltimore and Ohio, and other Railroads. Also used by the U. S. Post Office, Warehouses and Platform Scales and Scales for all purposes. Machines for testing materials, all sizes.

Works, 9th st., at Master; Store, 528, 4th st., Philadelphia, Pa.

Sold by the hardware

"DRAW CUT"
BUTCHERS' MACHINES.
Choppers, Hand and Power
Stuffers.
Lard Presses.

Warranted thoroughly made
and the BEST IN USE.

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Manufacturer of
**Octagon
Tea Pots.**

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Send for Price List.

Established in 1839.

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Manufacturers of L. COE.
GENUINE IMPROVED
AND MECHANICS
Wide Bar Full Length.

Wide Bar Full Length.
PATENT SCREW WRENCHES
UNDER PATENTS DATED

JUNE 26, 1866,
MARCH 23, 1869,
REISSUED JUNE 1, 1869,
IMPROVED AUG. 1, 1877.

NOVEMBER 10, 1863,
FEBRUARY 23, 1864,
REISSUED JUNE 1, 1869,
IMPROVED AUG. 1, 1877.

The back thrust when in use borne by the SHANK instead of the Handle
None genuine unless stamped "L. COES & CO."

WORCESTER, MASS.

Warehouse, 97 Chambers St. & 81 Reade St., N. Y.
DURRIE & McCARTY, Sole Agents.

The 1880 Pennsylvania Lawn Mower.
OUTSTRIPS ALL COMPETITORS. PREMIUMS TAKEN OVER ALL OTHER MOWERS.
EVERY MACHINE WARRANTED TO WORK AS REPRESENTED.

Points Claimed as being Meritorious :

The lightest; runs more easily; cuts longer grass; requires less repairs; is more durable; cuts more smoothly; don't require sharpening once where others do half a dozen times.

PRICE LIST.

Width of Cutter.	Style.	Driving Wheels.	Power required.	Weight.	Price.
10 inch.		8 inch.	A Child.	30½ lbs.	\$14.00
12 "		8 "	A Lad.	33½ "	18.00
14 "		8 "	A Lady.	36 "	20.00
16 "		8 "	One Man Size.	38 "	22.00
18 "		8 "	"	41 "	24.00

NEW MACHINES

For Cutting Long Grass
15 inch, 10½ inch Driving Wheels, 6½ inch
Cylinder, Man Size, 48 lbs. \$23.00
17 inch, 10½ inch Driving Wheels, 6½ inch
Cylinder, Man Size, 51 lbs. \$25.00

QUAKER CITY 10-INCH LAWN MOWER, - - - List \$12.00

The QUAKER CITY guaranteed the best Mower for price manufactured.

Discount to the trade.

FOR SALE BY
DUCHARME, FLETCHER & CO., Detroit, Mich.
DURRIE & McCARTY, New York.
KNUSE & BAILEY, Cincinnati, O.
PRATT & CO., Buffalo, N. Y.
SIMMONS HARDWARE CO., St. Louis, Mo.
HAMILTON & MATHEWS, Rochester, N. Y.
MARKLY, ALLING & CO., Chicago, Ill.
I. HART & CO., Louisville, Ky.

**THE NEW
"CHARTER OAK"
LAWN MOWER.**

The most beautiful and perfect Lawn Mower in the world. It stands to-day at the head of the list of Lawn Mowers in the United States and Europe. It is mounted on two large driving wheels or pulleys, and instead of being on the outside of the frames, to run in the uncut grass, they are placed inside the frames, so that the operator can run on them on a shaft, each independent of the other, allowing the machine to be turned either to the right or the left without injury to the sod, and to be turned around in a circle no greater than its own length, and cutting at the same time. Those desiring a perfect Lawn Mower will find the "CHARTER OAK" far superior to any other. It is more durable, and easier to adjust, more compact in order, and the driving wheels, being inside the frames, enables the operator to cut the grass clean around walks, drives, flower-beds, trees and shrubbery.

Manufactured in Five Sizes.

8-inch, 10-inch, 12-inch, 15-inch (standard)
18-inch.

H. S. MANNING & CO.,
Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S

Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Tops, Screw Plates, Tap Wrenches and Patent Relieved Pipe Tops and Pipe Reamers, also of Solid Bolts and Pipe Dies. Furnished in V. U. S. Standard and Whitworth shape of threads.

111 Liberty Street.

DAVID HYMES & CO.,
92 Church St., New York.

HEDGES HARDWARE CO.

HART & CO.

CLEMSON & CO.

KING & BLEIER.

Sample orders solicited.

NEW sizes Patent Malleable Iron Oilers, Nos. 2 and 3.

NEW pattern Heavy Screw Clamps; strongest in the market.

Send for Price List.

Malleable Iron Castings

of superior quality, and Hardware Specialties in Malleable Iron made to order.

HAMMER & CO., Branford, Conn.



INDUSTRIAL ITEMS.

MAINE.

There is talk of establishing sampling and smelting works at Portland. The idea is to form a company with a capital of \$200,000, all of which will be put in the treasury for working capital. This will be divided into 2500 shares of a par value of \$100. Subscriptions will be received in due time for 1000 shares at \$25 per share. The remaining 1500 shares will remain in the treasury until such time as the company may require them for enlarging the works. The business of the company will be buying, assorting, sampling and shipping ores. They propose at first to erect only a small smelting furnace for the purpose of working up small lots of ore. Several parties, it is said, have already offered to take from \$500 to \$2000 in stock apiece.

MASSACHUSETTS.

A charter was granted a few days since for the incorporation of the Whitehead & Atherton Machine Company of Lowell, with a capital of \$50,000. There are but four corporators, and the officers are William E. Whitehead, president; Abel T. Atherton, treasurer, and William Robinson, clerk. The foundry of the company has been for some time in operation at Tewksbury, and their proposed machine shops they hope will be ready for occupancy by August next. The main building will be of brick, 200 by 50 feet and three stories in height, and in addition there will be a blacksmith shop and engine house.

The Plymouth Mills Company, of Plymouth, have just completed a widening of their wire platform, which doubles its storage capacity. They have also put in a Fairbanks' platform scale, and are building an addition to their annealing house.

The Pacific Mills, of Lawrence, have had an engine made for them by the Buckeye Engine Company, of Salem, Ohio.

The Johnson Manufacturing Company, of North Adams, have begun a 100-foot brick addition to their mill.

The nail factory at East Bridgewater has started up.

CONNECTICUT.

Messrs. P. Jewell's Sons have just finished a main belt for Wallace & Sons, of Ansonia, which is 70 feet long, 30 inches wide, and over three-quarters of an inch in thickness, there being three thicknesses of the best leather used in its manufacture.

H. B. Brown & Co., machinists, of East Hampton, are doing a good business. They recently shipped to Japan a large nut and bolt cutting machine which is capable of cutting the thread to a 3-inch nut or bolt; and they have a large one now in process of construction for the Pennsylvania Railroad Company's shops.

The new, large additions to the wire mill of E. S. Wheeler & Co., at East Haven, will be completed in a short time. They are respectively 160 feet long by 80 feet wide, and 121 feet long by 50 feet wide.

NEW YORK.

Last Thursday afternoon an accident, which might have had fatal results, occurred at the building occupied by Messrs. Abeel Brothers, 190 South street. The second floor of the building was used for storing iron, and at the time of the accident contained about 300 tons of bar iron. At about 5 o'clock in the afternoon the men at work in the building heard an ominous cracking, and had barely time to rush into the street when a considerable portion of the floor gave way, carrying with it most of the wall facing on Water street. Fortunately no one was injured. The precise cause of the accident is not yet known, as the work of removing the wreck has not proceeded sufficiently to enable an investigation to be made. Messrs. Abeel Brothers have been obliged to rent an adjoining building in which to store their iron while the repairs are being made. The whole wall on the Water street side will have to be rebuilt.

One of the boilers in the Rome Merchant Iron Mill burst on the morning of the 10th, killing four men and injuring a large number of others. The mill was badly wrecked. The accident will throw about 250 men out of employment.

NEW JERSEY.

Advices from Phillipsburg say: The only furnace out in this section is Durham. The Delaware Rolling Mill, at Phillipsburg, had a very brief run, and is now closed.

PENNSYLVANIA.

The following appears among the dispatches in the daily papers: George D. Roseberry, spike and nail manufacturer, of Pottsville, failed May 17, with liabilities not exceeding \$50,000. Shrinkage in the price of iron is assigned as the reason for the failure.

After a brief suspension of operations the work of tearing down and rebuilding the furnace at St. Clair, Schuylkill County, has been resumed, and now the Philadelphia and Reading Coal and Iron Company have a double force of men working there. The improvements will, it is expected, be completed some time in June.

It is reported that one of C. M. Atkins & Bro.'s furnaces, Pottsville, has chilled, and will have to be dug out. This work will be very expensive, and will cause considerable loss of time. The managers can assign no reason for the chilling.

At Newcastle, on the 13th, the only works in operation were the mill of Bradley, Reis & Co., the sheet mill of the Lawrence Iron Works and the Clara Furnace of Raney & Berger.

At Erie the erection of a large malleable iron manufactory has been commenced, which when completed will cover an acre of ground.

The Martha Bennett Furnace, at Fort Carbon, which was unsuccessfully blown in twice during the past two months, has been blown out, relined and repaired, and will be blown in some time about the 1st of June, under the management of George W. Cole.

The Philadelphia North American says that A. Weed & Co., manufacturers of improved file machinery, are working night and day, with two sets of hands; that C. W. Ervien & Co. are building an 80-horse-

power engine for a Cuban firm, and have orders on hand for five more, and that Henry Disston & Sons are erecting a large rolling mill at Tacony, where they will in future manufacture all their own steel.

John Roach, the Philadelphia ship-builder, is employing as being about to add to his establishment a large rolling mill by removing the rail mill now owned by him from Danville to a lot adjoining the ship yard.

A new machine shop and engine works have been opened at the corner of Beach and Marlborough streets, Philadelphia, by A. L. Archambault, formerly of the Kensington Iron Works.

A new branch is now being attached to the mill at Middlesex. This is a chain factory, which will be completed in a few days.—*Pittsburgh Dispatch*.

The mills at Middlesex are still lying idle, and as yet no hopes of their starting are given by the proprietors, but we hear daily from outside parties that they will be running in a short time. The furnaces are running under the new company.

It is stated that Ario Farde has given \$15,000, and the borough of Watsonton, Northumberland County, as much more toward starting car works at that place.

On the afternoon of the 8th inst. the hoist of Leibbrandt & McDowell's Moselem Furnace, in Berks County, was entirely destroyed by fire. The furnace has not gone out of blast, as the stock is being hoisted by rope and tackle, and it is hoped it can be kept going until a new hoist can be built.

The number of tons of pig iron made at the Warwick Furnace, for the week ending Saturday, the 8th inst., was 410 tons, while at the furnace of the Pottstown Iron Company 323 tons were made in the same time.

The new furnace at Dunbar was blown in on the 12th inst., but will blow out shortly, the owners wishing only to try her and not to run her at present.

The Palo Alto Rolling Mill will probably be shut down at the end of this month.

The small furnace at Rodman was to have blown out last week.

PITTSBURGH AND VICINITY.

The National Association of Window Glass Manufacturers held a special meeting in Pittsburgh last week and decided to order a stoppage of the window glass houses for three months, beginning June 1, 1880. Two or three factories that have been in operation but a few months will be allowed to run during this time if they wish. Nearly all the old window glass factories have a good stock of glass on hand sufficient to run them through the summer months. The regular meeting of this association will be held at Cape May, July 14.

There is no truth in the report that Moorhead & Co.'s Soho mill is about to shut down. A. Bradley & Co.'s stove foundry shut down on Monday, the 10th inst., for an indefinite time.

Messrs. Emerson, Smith & Co.'s saw works at Beaver Falls are running full force, with all the orders they can fill.

The oil refining business in the Pittsburgh district, which includes ten refineries under the control of the Standard Company, has been in a very depressed condition for some time. The indications are, however, that operations will be resumed early in June. The crude oil tanks are nearly all full, and it is estimated that about 355,000 barrels are stored. At No. 1 Standard refinery extensive repairs have been made, and the works can be started on short notice.

H. K. Porter & Co. shipped another locomotive to Japan last week. The engine had to be taken apart and securely packed in boxes, each distinct package bearing the address "Poronai Railway, Obora, Hokkaido, Japan."

The Pittsburgh Chain Works, at New Brighton, under present management and control, commenced operations in August, 1879, since which time it has run without interruption. The company has iron bought right, and is making several specialties. C. Walde, formerly of Philadelphia, is the new manager.

Stack No. 1 of the Lucy Furnace Company has gone out of blast.

WEST VIRGINIA.

The roof of the hot-blast furnaces at the Belmont Mill fell on the 14th inst. The accident was caused, it is supposed, by contraction. The loss is about \$200, and the repairs will be made while the furnace is banked up.

OHIO.

A new hot blast is being erected at the Benwood blast furnace.

The Hartford coal mines, near Salineville, will be started soon. They have been idle nearly two years.

The Portsmouth Foundry and Machine Works have six boilers ready for shipment to New Orleans. They are intended for use on sugar plantations in that region.

The Siemens-Martin department of the Portsmouth Burgess Steel Works is again running.

Brown, Bonnell & Co. thus far have had no reason to place any of their mills on single turn by reason of a scarcity of orders, and every department is running to its fullest capacity. They have a large trade in splices for railroads, and are now filling a heavy order for the St. Paul and Minneapolis Railroad Company. The boilers for the new puddling furnaces have all been placed in position, and the furnaces will be ready for lighting within two weeks.—*Youngstown News*.

The boiler works of W. B. Pollock & Co., Youngstown, are crowded with orders sufficient to keep a large force of men employed.

At present they are finishing an iron bridge for the Brier Hill Iron Company, to be used between the hoisting house and top of the furnace which has been undergoing repairs for some time. The firm also have the contract for building three large flue boilers for the same company, to replace those injured and destroyed by the late explosion at Grace Furnace.

The Jefferson Iron Works, of Steubenville, have resumed operations after a suspension of about one month. The works comprise two large furnaces, 22 boiling furnaces and 85 nail machines. The furnaces have a capacity of 30,000 tons of pig iron per year.

At the Ironton Rolling Mill of the New York and Ohio Iron and Steel Company, the

boilers are in place and the sheet iron stacks are in readiness. The furnace is ready for operation. A kiln of ore will be fired this week.

Mr. Brownstead, of the Grant Furnace, thinks the furnace never had a better start off than the indications this season show. He argues that the third tuyere added this season is a great benefit to the manufacture of metal, which continues to be a good quality. The furnace is running about the same as last year, making about 13 tons. Sixty tons of No. 3 car-wheel were shipped to Cincinnati on Monday.—*Ironton Register*.

The Powell Tool Company, Cleveland, are so pressed with business as to compel an increase of their works, and they are, therefore, building an addition of 50 feet, with 10 more forges, which will be in operation in about 30 days.

GEORGIA.

We learn from an exchange that preliminary operations have been begun for the erection of the largest iron foundry in the South. It is to be erected on the Etowah, near Rome, by J. J. Seay. The building will require 280,000 bricks, cover two acres of ground, employ 80 men and be completed by July 1.

Seventy-five State convicts are to be employed in running the Roger E. Peacock Mine, located near Cartersville, on the Etowah State road. C. B. Howard is to operate the mine, and will engage in the manufacture of charcoal iron, used for making car wheels. As soon as he gets a sufficiency of charcoal the furnaces, which has a capacity of about 8 tons per day, will be put in blast.

KENTUCKY.

Bellefonte Furnace was to have commenced her year's blast on Monday, the 17th.

Pennsylvania Furnace is doing well. Iron Hills Furnace is expected to start up on the 24th inst.

Mount Savage commenced her blast on the 10th inst.

MICHIGAN.

It is reported that Charlevoix is to have a blast furnace.

The following from the *Marquette Mining Journal* is a statement of shipments of iron ore from the upper peninsula, up to and including Wednesday, May 5:

	MARQUETTE.
Cleveland	5,637
Lake Superior	2,681
Champion	1,920
Ore to local points	9,643
Total	17,180

	ESCANABA—MARQUETTE MINES.
Angeline	878
Barnum	3,772
Cleveland	4,037
Groch	1,422
Jackson	3,542
Jackson, South	604
McComber	906
National	3,210
New York	4,080
Palmer	1,400
Rolling Mill	2,671
Salsbury	57
Superior	6,000
Superior, Hematite	714
Winthrop	1,774
Total	38,837

	MENOMINEE MINES.
Curry	2,175
Cyclops	2,213
Emmett	2,045
Norway	9,730
Perkins	2,920
Stephens	4,245
Vulcan	4,730
Total	29,898

Making a grand total of 68,735 tons.

	MISSOURI.
The Missouri Car and Foundry Company	turning out 200 car wheels per day, and 25 tons of other castings for car-building purposes.

H. S. Hopkins & Co., of St. Louis, bridge-builders, are about to erect extensive buildings near the Laclede Rolling Mills. They will give employment to from 175 to 200 workmen.

The Wangler Boiler Works, St. Louis, are full of orders.

SCIENTIFIC AND TECHNICAL.

A new industry is reported to be growing up in Newark which yields a product suitable for a great many purposes.

"BONSLATE" is the name given to this substance, which, it is claimed, will take the place of ivory, rubber, celluloid and similar materials. It is said to be composed chiefly of finely ground bone, agglutinated by some cementing compound, which, when in its plastic state, can be molded into shape.

Chemists apparently are very eager to associate their names with the discovery of a new element, and it is probably owing to this fact that so many elementary substances are announced of which very little or nothing is heard in after years.

NORVEGIAN

does not, however, appear to be of the number, Dahl, who first discovered it in the pyrites of Kragerö, Norway, has recently published some additional facts. The metal is white, of high specific gravity (0.44), has its melting point at 662 degrees and is not very ductile. Its chief chemical characteristics are that it dissolves in nitric acid, yielding a blue solution which turns green when diluted. Alkalies give green precipitates, soluble, with a blue color in excess. Sulphuretted hydrogen yields a brown precipitate.

Quite a commotion has been caused in scientific circles by the announcement that Prof. Graham Bell has deposited with the Smithsonian Institution a sealed package, containing the description of an invention for

SEEING BY TELEGRAPH.

The subject of transmitting images by electrical means to a distance appears to have seriously engaged the attention of a number of investigators, both in this country and in England. Patents were taken out some time since by Messrs. Connelly and Metcalf, of Pittsburgh, and by Dr. Hicks, of Bethlehem, and in England Professors Ayrton and Perry and Mr. H. Middleton, of Cambridge, have now come forward with two distinct proposals.

At the Ironton Rolling Mill of the New York and Ohio Iron and Steel Company, the

elaborate and expensive, the varying intensity of the light of any image being made to create currents of varying intensity, in a series of selenium plates or a number of thermopile elements. The arrangement of the receiving apparatus varies more widely. No details whatever are given as to the methods proposed by Prof. Bell.

A principle differing from that ordinarily employed has been adopted in

THE DEPREZ INDICATOR, which is said to be particularly suitable for high-speed engines. Generally the pencil of the indicator receives a motion from the spring parallel to the axis of the cylinder having the paper, while this cylinder has a motion proportional to that of the engine piston. M. Deprez has lately contrived an indicator in which only the pencil moves, the paper being fitted on a plane surface at rest. The problem was to give a point, C, a motion which should be each instant proportional and parallel to the resultant of the motion of two other points, A and B. He has found a solution in the pantograph, if the three points A B C are those which, in this instrument, are always in a straight line. In adapting to the indicator, the point A is attached to the piston of the instrument, the point B (which should be guided in a straight line) to the cord commanded by the piston of the engine, and the pencil is placed at C. The two movements of the two

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NEW YORK WHOLESALE PRICES, MAY 19, 1880.

METALS.

IRON.—DUTY: Bars, 1 to 1 $\frac{1}{2}$ in., 7 $\frac{1}{2}$; Sheet, Band Hoop and Scroll, 1 $\frac{1}{2}$ to 3 $\frac{1}{2}$ in., 7 $\frac{1}{2}$; provided that none of the above iron is to be sold for less than 7 $\frac{1}{2}$ per cent. plus 7 $\frac{1}{2}$ per cent. Polished Sheet, 7 $\frac{1}{2}$ per cent. plus 7 $\frac{1}{2}$ per cent. Wrought Scrap, 7 $\frac{1}{2}$ per ton; Cast Scrap, 6 $\frac{1}{2}$ per ton. Railroad 7 $\frac{1}{2}$, 7 $\frac{1}{2}$ per ton; Boiler and Plate, 1 $\frac{1}{2}$ per ton. **Pig Iron—AMERICAN** (Nominal) 7 $\frac{1}{2}$ per ton 25 $\frac{1}{2}$ to 28 $\frac{1}{2}$. No. 22, " 20 $\frac{1}{2}$ to 25 $\frac{1}{2}$. Gray Forge, " 25 $\frac{1}{2}$.

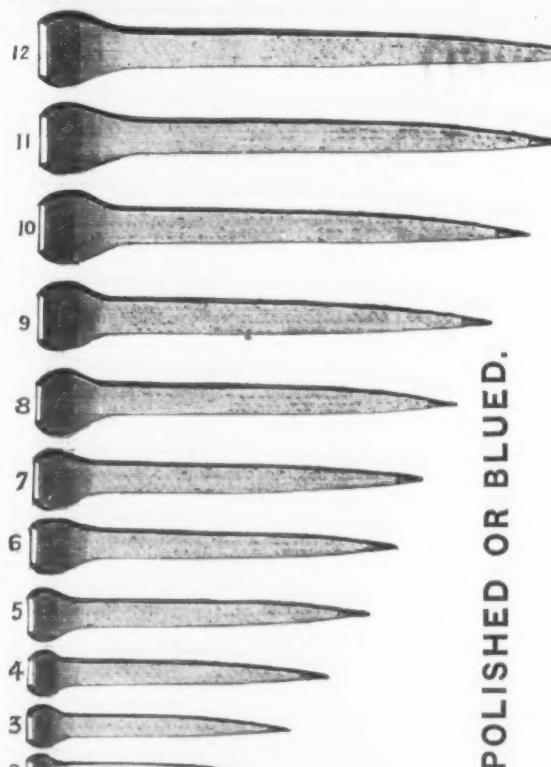
Etainton, 7 $\frac{1}{2}$ per ton 21 $\frac{1}{2}$. Cullins, 24 $\frac{1}{2}$. Glenarmock, 22 $\frac{1}{2}$ to 23 $\frac{1}{2}$. Gartsherrie, 22 $\frac{1}{2}$.

BARS. Iron, nominal, 7 $\frac{1}{2}$ per ton 28 $\frac{1}{2}$ to 29 $\frac{1}{2}$. Steel, nominal, 7 $\frac{1}{2}$ per ton 26 $\frac{1}{2}$ to 28 $\frac{1}{2}$. Oil Rail T's (nominal), 7 $\frac{1}{2}$ per ton 26 $\frac{1}{2}$.

Scrap. Wrought Scrap 7 $\frac{1}{2}$ per ton (nominal), 26 $\frac{1}{2}$ to 27 $\frac{1}{2}$. **HOT IRON, IRON STORE.**—Nominal Prices. Common Iron: 1 to 6 in. round and square, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ per cent. Refined Iron: 3 $\frac{1}{2}$ to 2 in. round and square, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ per cent. 1 to 6 in. x 3 $\frac{1}{2}$ and 4 in. 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ per cent. Rods—1 to 6 $\frac{1}{2}$ and 10 to 12 in. round and square, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ per cent. Bands—1 to 6 $\frac{1}{2}$ to 10 to No. 12. Norway Nail Bars, 7 $\frac{1}{2}$ c.

Sheet Iron. R. G. American. Nos. 10 to 20, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ per cent. 21 to 24, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$. 25 to 28, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$. 29 to 32, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$. Galvanized, 10 to 25, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ per cent. 21 to 28, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$. 29 to 32, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$. 33 to 36, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$. Patent Plated, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ per cent. Russia, 14 $\frac{1}{2}$ to 15 $\frac{1}{2}$ c. American Cold Rolled, 7 $\frac{1}{2}$ to 8 $\frac{1}{2}$ per cent. **COPPER.**—DUTY: Pig, Bar and Ingots, 1 $\frac{1}{2}$ per cent. Copper (including all articles of value) is a component of chief value. American Ingots, 7 $\frac{1}{2}$ See Trade Report. SHEATHING, BRAZERS' COPPER, BOLTS, &c. Brazers' Copper, ordinary sizes, 100 per sq. ft. 14 $\frac{1}{2}$ and 16 $\frac{1}{2}$ per cent. Brazer's Copper, ordinary sizes, under 10 oz. and over 12 oz., 7 $\frac{1}{2}$ per cent. Brazers' Copper, 10 to 12 oz., 7 $\frac{1}{2}$ per cent. 12 to 14 oz., 7 $\frac{1}{2}$ per cent. Circles less than 8 $\frac{1}{2}$ in. in diameter and over, 7 $\frac{1}{2}$ per cent. Segments and Pattern Sheets, 7 $\frac{1}{2}$ per cent. Sheathing Copper, over 12 oz., 7 $\frac{1}{2}$ per cent. Bolt Copper, 7 $\frac{1}{2}$ per cent. Copper Bottoms, 7 $\frac{1}{2}$ per cent. No Copper is Sheathing except 1 $\frac{1}{2}$ to 2 inches and not to exceed 34 oz. to the sq. ft.

BRASS. Brown & Sharp's Gauge the Standard for Metal; Old English Gauge the Standard for Wire. BRASS MANUFACTURERS' PRICE LIST.—London, Jan. 18, 1880. Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 2 $\frac{1}{2}$ per cent. HIGH BRASS. All Nos. not thinner than No. 30, wider than 2 in., not wider than 1 in., 7 $\frac{1}{2}$ per cent. All Nos. to No. 25, inclusive, and widths over 14 to 20 in. inclusive, 7 $\frac{1}{2}$ per cent. All Nos. to No. 25, inclusive, and widths over 14 in. 7 $\frac{1}{2}$ per cent. advance on each No. above Nos. 25 to 35, inclusive. All Nos. thinner than No. 30 is Platers' Brass, at .50¢ per lb. Sheets 24x48 and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in., .50¢ per lb. Printers' Rules, .50¢ per lb. Sheets wider than 40 in. and over, .50¢ per lb. Circular Sheets, in diam. from 4 in. to 14, inclusive, .50¢ per lb. over 14 in., .50¢ per lb. All Nos. to No. 25, inclusive, .50¢ per lb. Metal in width 1 $\frac{1}{2}$ in. to 14, inclusive, not thinner than No. 25, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150, 155, 160, 165, 170, 175, 180, 185, 190, 195, 200, 205, 210, 215, 220, 225, 230, 235, 240, 245, 250, 255, 260, 265, 270, 275, 280, 285, 290, 295, 300, 305, 310, 315, 320, 325, 330, 335, 340, 345, 350, 355, 360, 365, 370, 375, 380, 385, 390, 395, 400, 405, 410, 415, 420, 425, 430, 435, 440, 445, 450, 455, 460, 465, 470, 475, 480, 485, 490, 495, 500, 505, 510, 515, 520, 525, 530, 535, 540, 545, 550, 555, 560, 565, 570, 575, 580, 585, 590, 595, 600, 605, 610, 615, 620, 625, 630, 635, 640, 645, 650, 655, 660, 665, 670, 675, 680, 685, 690, 695, 700, 705, 710, 715, 720, 725, 730, 735, 740, 745, 750, 755, 760, 765, 770, 775, 780, 785, 790, 795, 800, 805, 810, 815, 820, 825, 830, 835, 840, 845, 850, 855, 860, 865, 870, 875, 880, 885, 890, 895, 900, 905, 910, 915, 920, 925, 930, 935, 940, 945, 950, 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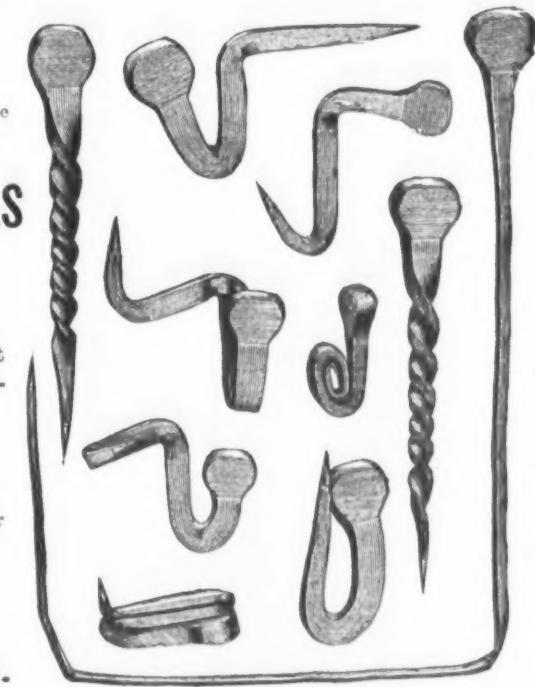
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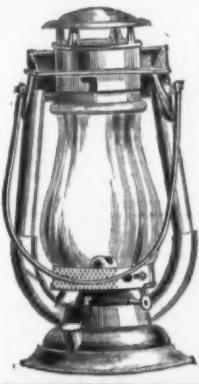
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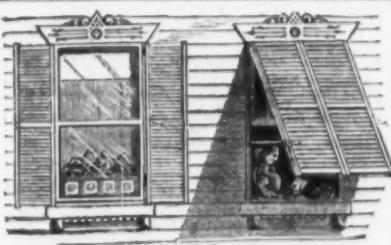
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BELTING
JOBBERS OF
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PACKING CO.

Rails.	
Sliding Door Wrought Brass.....	\$ 24.00 per doz 20 1/2
" Iron, Painted, 1/4" foot sq. dis 50¢ 20 1/2	
Barn Door 1/4" & 3/4" inch.....	dis 50¢ 20 1/2
" for N. E. Hangers.....	dis 50¢ 20 1/2
Hammers.	
Cast Steel.....	8 10 12 14 16 teeth.
Mallets.....	8 10 12 14 teeth.
" 5.75 6.50 7.25 8.00	dis 50¢ 20 1/2
Razor Straps.	
engine Emerson.....	dis 40¢ 20 1/2
Baldwin's Emerson.....	dis 40¢ 20 1/2
Baldwin's (not Emerson).....	dis 40¢ 20 1/2
Evans'.....	dis 40¢ 20 1/2
Johnson's.....	dis 40¢ 20 1/2
Hunt's.....	dis 40¢ 20 1/2
Chapman.....	dis 40¢ 20 1/2
Saunders'.....	dis 40¢ 20 1/2
Townsend's.....	dis 40¢ 20 1/2
Knives.	
Iron and Tinned { new list Oct. 1, 1879 }.....	dis 30¢ 20 1/2
In Bulk Rivets and Burns.....	dis 25¢ 20 1/2
Copper Rivets and Burns.....	dis 25¢ 20 1/2
" 4.00 5.00 6.00 7.00 8.00 9.00	dis 25¢ 20 1/2
Tinned Iron Best Rivets and Burns.....	dis 25¢ 20 1/2
Rivet Sets.	
Rods.....	
Stair..... New list, March 1, '79, dis 40¢ 20 1/2	
" American Patent.....	
Hollers.	
Eam Poor, Sargent's list.....	dis 40¢ 20 1/2
Mowbray's.....	dis 40¢ 20 1/2
Acme (Anti-Friction).....	dis 40¢ 20 1/2
Kops.	Manufacturers' Net List, Dec. 10, 1879.
Manila.....	1/2 inch and larger, \$ 1.40 each
" 1/4 and 1/2 inch.....	1/4" 1.00 1/2" 1.40 3/4" 1.80
Tard Rope.....	1/2" 1.40 1/4" 1.20 1/8" 1.00
" Lathe Yarn.....	1/2" 1.40 1/4" 1.20 1/8" 1.00
Hay Rope.....	1/2" 1.40 1/4" 1.20 1/8" 1.00
Seal.....	3/8" inch 1.40 1/4" 1.20 1/8" 1.00
" 1/4 and 1/8" inch.....	1/4" 1.40 1/8" 1.00
" Hay Rope.....	1/4" 1.40 1/8" 1.00
Rules.	Boxwood, Ivory
Chaplin's.....	dis 55 & 10¢ 20 1/2
Standard.....	dis 45 & 10¢ 20 1/2
Stanley.....	dis 55 & 10¢ 20 1/2
Stephens.....	dis 55 & 10¢ 20 1/2
Sad Irons.	
From 1 to 10 lbs. Self Heating.....	dis 45¢ net
Gleason's Shield and Toilets.....	dis 25¢ net
Enterprise Patent Cold Handle.....	dis 20¢ net
Mrs. Pott's Pat. Cold Handle, "Crown".....	dis 20¢ net
Combined Fluter and Sad Iron, per doz \$1.00, dis 15¢ net	
Sand Paper.	
Baader & Adamson's Flint, co to 1/4" .42¢ 1/2 per ream	
" Assorted .47¢ per ream 20¢	
" Star... .37¢ per ream 25¢	
" Premium .50¢ per ream 25¢	
New England, same list as H. & A. Flint, dis 20¢ & 5¢	
Sash Cords.	
Common.....	dis 14 to 20 net
Patent.....	dis 14 to 20 net
Silver Lake Russia Flax.....	dis 14 to 20 net
Enterprise Cotton.....	dis 14 to 20 net
" Drab Cotton.....	dis 14 to 20 net
Raw Hide.....	dis 25¢ net
Steel Ribbon.....	dis 10 to 20 net
Sash Locks.	
Clark No. 1, glass: No. 2, 30¢ per gross.....	dis 33¢ 20 1/2
Perrin's.....	dis 33¢ 20 1/2
Walker's.....	dis 10 to 20 net
Hammond's Window Springs.....	dis 10 to 20 net
Northrup Window Springs.....	dis 10 to 20 net
The Perfect, Clark Smith, Plain Jap d. 2¢ gross \$10.00 net	
" Por. Knob Jap d. 2¢ gross 14.00 net	
Nickel-Plated..... 2¢ gross 27.00 net	
Sash Weights.	Solid Eyes, in 30 lbs. and over.
Musgrave Stuffers or Filler.....	dis 23¢ net
Miles.....	dis 20¢ 20 1/2
Porter.....	dis 20¢ 20 1/2
Draw Cut No. 4.....	each \$1.00, dis 20¢ 20 1/2
Enterprise Mfg. Co.	dis 15¢ 20 1/2
Silver's.....	dis 20¢ 20 1/2
Saws.	
Diamond Circular.....	dis 35 & 5¢
" Mill.....	dis 35 & 5¢
" Cross.....	dis 20 & 5¢
" Hand Panel, H. & A.	dis 20 & 5¢
Boynton's Lightning, Cross Cuts, new list.....	dis 20 & 5¢
" One-Man all lengths.....	dis 20 & 5¢
" Billet Web, 30 in.....	dis 20 & 5¢
" Lightening, 30 in Saw X Pattern.....	dis 20 & 5¢
Chatillon's Hand, Panel and Rip.....	dis 20 & 5¢
Wheeler & Clegg Co. Cross-Cuts, except Monarch, dis 20 & 5¢	
Livingston's Household Kitchens.....	dis 20 & 5¢
Framed Wood.....	dis 20 & 5¢
Nos. 101 102 103 104 105	Per doz \$10.00 \$8.50 10.00 7.50 8.75 net
 Saw Frames.	
White, Vermont.....	dis \$1.35, dis 25¢
Red, Polished and Varnished.....	wdos \$2.00, dis 25¢
Gold, Polished and Varnished.....	sdos list dis, 10¢ to 20¢
Saw Sets.	
Byron's Patent X Cut, per doz. \$1.00: Hand Saw, per doz. \$1.00.	
Stillman's Genuine.....	dis \$1.60-\$1.80 net
Common Lever.....	per doz \$2.00, dis 20 & 5¢
Leach's.....	No. 1, \$1.50; No. 1, \$1.00, dis 15¢ 20 1/2
Nash's.....	No. 1, \$1.50; No. 2, \$1.00, dis 20 & 5¢
Hammer, "Sledge".....	dis 20 & 5¢
Bemis & Call Co.'s New Pat., dis 20 & 5¢	
" Plate.....	dis 10 to 20 net
Tinners' Tools and Machines.	
Tinners' Tools and Machines, list add 12½¢	
Tools (P. E. & W.)....	list add 12½¢
Transom Lifters.	Wollaston's Patent, dis 20 & 5¢
Traps.	
Game Newhouse.....	dis 30¢
One-Man, Newhouse Pattern.....	dis 30¢
" Blake's Patent.....	dis 45¢
Mouse, Wood, Choker.....	dis 20 & 5¢
Round Wire.....	dis 20 & 5¢
" Round Wire.....	dis 20 & 5¢
" Catch-men alive.....	dis 10 to 20 net
" Catch-men alive.....	dis 20 & 5¢
Rat, "Devoy".....	per doz \$1.00, dis 10 to 20 net
Trowels.	
Lathrons Brick and Plastering.....	dis 10 to 15¢
Peck's Brick and Plastering.....	dis 10 to 15¢
Diamond's Brick and Plastering.....	dis 10 to 15¢
Peace's Plastering.....	dis 10 to 15¢
Clement & Maynard's.....	dis 10 to 15¢
Brader's Brick and Plastering.....	dis 10 to 15¢
Worrell's Brick and Plastering.....	dis 10 to 15¢
Garden.....	dis 45¢
Triees.	
Butterell and Ch. ae.....	dis 20 & 5¢
Vanes.	
Solid Box.....	List of July 1, '79 dis 25¢
" Crown" (A. H. Hildick) 40 to 100 lb, 1/2 net	
" Peter Wright's.....	1/2 net
Parallel Parkers.....	dis 10 to 20 net
" Howard's.....	dis 20 & 5¢
" Merrill's.....	dis 18 to 25¢
" Bargent's.....	dis 40 & 10¢
" Fretton's.....	dis 20 & 5¢
" Becken and Upton.....	dis 10 to 15¢
" Fisher & Norris.....	dis 18 to 20 & 5¢
" Stevens'.....	dis 25 & 5¢
" Chapman's Adjustable.....	dis 25 & 5¢
" Family's List.....	dis 10 to 20 net
" Sav. Flbers, Bonney's.....	dis \$14.00, dis 20 & 5¢
" Lowell Hand Vises.....	dis 15 to 20 net
Richardson's Vise and Anvil.....	dis 20 & 5¢
Washer Cutters.	
Smith's Patent.....	dis 12.00 dis 25¢
John's.....	dis 12.00 dis 25¢
Penny's.....	dis 12.00 dis 25¢
Appleton's.....	dis 12.00 dis 25¢
Wheels.	— Revised list.....
Well Wheels.....	dis 60 & 10¢
Screw Drivers.	
Douglas Mfg. Co.	dis 20 & 10 & 5¢
Sheldoni's Box Scraper (G. R. & L. Co.) 25¢ each 20 & 5¢	
Box, 1 Handl.....	dis 20 & 5¢
" 2 Handl.....	dis 20 & 5¢
Defence Box and Ship.....	dis 20 & 10 & 5¢
Foot.....	dis 20 & 5¢
Sheldoni's Box Scraper (G. R. & L. Co.) 25¢ each 20 & 5¢	
" Providence Tool Co.	dis 10 to 20 net
Wire.	
Brass and Copper.....	List of Jan. 1, '79 dis 20 & 5¢
Bright and Annealed.....	nos. 0 to 18, dis 18¢ to 37¢ 5¢
" Galvanized.....	nos. 0 to 18, dis 18¢ to 37¢ 5¢
Coppered.....	nos. 0 to 18, dis 18¢ to 37¢ 5¢
Galvanized.....	nos. 0 to 18, dis 18¢ to 37¢ 5¢
Galvanized.....	nos. 0 to 18, dis 18¢ to 37¢ 5¢
Tinned.....	nos. 0 to 18, dis 18¢ to 37¢ 5¢
Cast Steel.....	dis 18 to 25¢
Stainless Steel.....	dis 18 to 25¢
Stanley Bros. & Levee Cos., Varnished Hds.....	dis 40 & 10¢
" Black Handles.....	dis 40 & 10¢
Sargent & Co. No. 4.....	dis 40 & 10¢
Gay's Double Action Hatchet.....	dis 40 & 10¢
per doz. 1 in., \$1.00; 1 1/2 in., \$1.20; 6 in., \$1.00 dis 30 & 5¢	
Screws.	
Flat Head Iron.....	dis 35 & 5¢
Round Head Iron.....	dis 35 & 5¢
Flat Head Brass.....	dis 35 & 5¢
Round Head Brass.....	dis 35 & 5¢
Brass and Silver Capped.....	dis 35 & 5¢
Galvanized.....	dis 35 & 5¢
Japan, 1/2" of 1000 Screws.....	dis 35 & 5¢
Lar or Common Coach.....	dis 35 & 5¢
Coach Patent Gimlet Point, List per 100.....	dis 35 & 5¢
Bed.....	dis 10 to 15
Machine, Flat Head, 1/2" Am. Screw Co.	dis 10 to 15
" Round Head Iron, Am. Screw Co.	dis 10 to 15
Beach, Iron.....	dis 40 & 10¢
" Wood Beech.....	dis 35 & 5¢
" Hickory.....	dis 35 & 5¢
Hand.....	dis 35 & 5¢
Hand Rail, Sargent's.....	dis 35 & 5¢
" Humason, Beckley & Co.	dis 35 & 5¢
Am. Screw Co.	dis 35 & 5¢
Jack (Wilson's).....	dis 35 & 5¢
Screw Window Balances.	
R. H. Huguenin, Single g. o., \$2.94; 5 gro., \$22.68, dis 35 & 5¢	
Shears and Scissors.	
Cast Iron, (American), see Pruning Hooks and Shears.....	dis 10 to 20
Barnard's Lamp Trimmers.....	dis \$2.75
Tinners'.....	dis 10 to 20
Cast Steel, List, Nov. 26, 1879.....	dis 10 to 20
Surgeon's.....	dis 10 to 20
Heinrich's.....	dis 10 to 20
" Tailors' Shears.....	dis 10 to 20
Shovels and Spades.	
Sliding Door, M. W. & Co. Hst.....	dis 30 & 25¢
R. & E. list.....	dis 10 to 20
Patent Ruler.....	dis 10 to 20
" Hatfield's.....	dis 10 to 20
Russell's Anti-Friction.....	dis 10 to 20
Moore's Anti-Friction.....	dis 10 to 20
Sliding Shutter, Sargent's list.....	dis 10 to 20
Moore's Anti-Friction (Hanging).....	dis 10 to 20
Philadelphia Hanging.....	dis 10 to 20
Shovels and Spades.	
Iron and Brass Head, R. & E. list.....	dis 10 to 20
Common Stamp'd Ware.....	dis 10 to 20
Stamped Deep and Reinforced Ware.....	dis 10 to 20

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See Page 3.

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BEST REFINED CAST STEEL

And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

Warranted most superior for TOOLS AND GRANITE ROCK DRILLS.

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Steel Blooms for Rails,

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Guaranteed at a speed of 10,000 a minute, and at any pressure for 10 years.**DEOXIDIZED BRONZE,**

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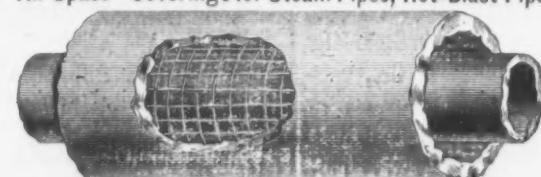
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The Patent "Air Space" Coverings for Steam Pipes, Hot-Blast Pipes, Boilers, &c.



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Window Shade Nails,

Upholstering, **WAGON NAILS**, Molding Nails,

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Veneer Nails, Label Tacks and small Nails of all kinds, Cabinet Nails, Barbed Lock Nails, Cigar Box Nails, &c., &c., put up to bulk, 5 lb. packages, papers, or as wanted.

AMERICAN WIRE NAIL CO.
Factory, Fifteenth and Madison Sts. COVINGTON, KY.

ESTABLISHED IN 1859.



PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 44a CANNON STREET, LONDON, E. C.

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SPECIAL FEATURES.

Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.

Special Correspondents.—The *Ironmonger* has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. *The Week*, *Legal News*, *Trade Notes*, *Bankruptcies*, *Foreign Notes*, *Colonial Jottings*, *Merchants' Circulars*, &c., are each departments of the journal, containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French, Belgian and other Special Correspondence.

SUBSCRIPTIONS

to the *Ironmonger and Metal Trades' Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is \$5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful *Ironmongers' Diary and Text Book*, a work sold to non-subscribers at 75 cents.

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MAY 29, JUNE 26, JULY 24, AUGUST 21, SEPTEMBER 18, OCTOBER 16, NOVEMBER 13, DECEMBER 11, JANUARY 8, 1881, FEBRUARY 5, MARCH 5, APRIL 2 and 30.

This Supplement is published in

FIVE LEADING COMMERCIAL LANGUAGESof the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach out in the native language of eighty millions of German, forty-two millions of French, twenty-eight millions of Italian, and fifty-one millions of Spanish speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

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THE WHOLE FOREIGN HARDWARE TRADE,so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. The Price List or Advertisement inserted in the *Ironmonger* and FOREIGN SUPPLEMENT is a strikingly powerful and most efficient way of publicity not to be compared with any of the other ordinary channels of communication.

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Successors to Milo Peck, Manufacturers of



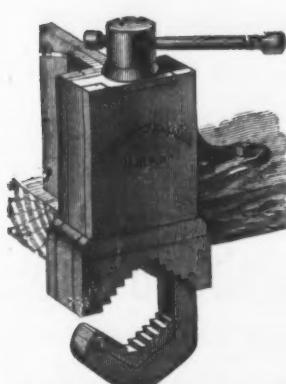
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WE HAVE A LARGE STOCK OF SPECIAL DROP PATTERNS.

Special attention given to the making of all Drop Dies.
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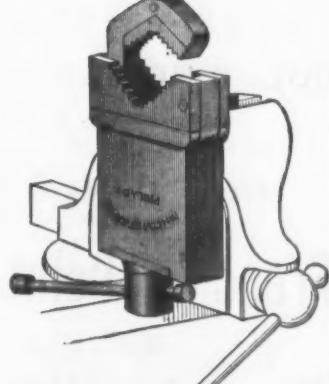
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IMPROVED PIPE-FITTERS' VISE.



STRONG,
LIGHT,
EFFICIENT,
CHEAP.



To meet the requirements of the large number of persons who have use for such an article, we invite attention to our Improved Pipe Vise. This Vise can be used either as a permanent fixture to work upon, or as a portable pipe vise (unlike others) be held before the work. It is a true Miller's or Blacksmith's Vise: the movable jaw being OPEN ON SIDE permits work to be gripped at any desired point without slipping it from end, and allows of FITTINGS BEING HELD securely. The Box is made of Malleable Iron, the Screw of Wrought Iron, and the remainder of Solid Steel throughout. The Steel Gripping Jaws can be duplicated and replaced at any time when worn out. It is a very convenient tool, well adapted to the wants of Plumbers, Pump Fitters, Well-Drivers, and all who have use for a tool that is strong, light, efficient and cheap, which can be readily carried about with kit of tools.

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Manufacturers of
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Of every description, including

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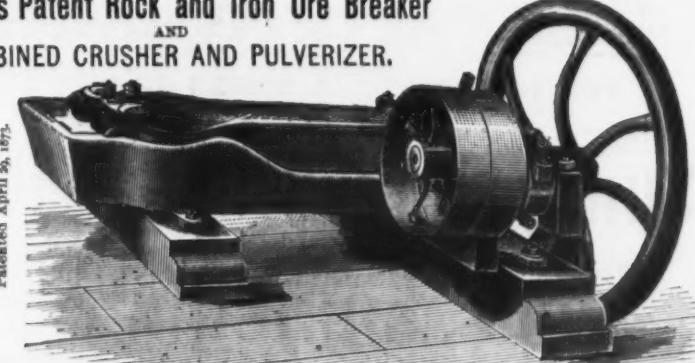
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And SOLID SAWS of all kinds.

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AND
COMBINED CRUSHER AND PULVERIZER.



Patented April 26, 1875.

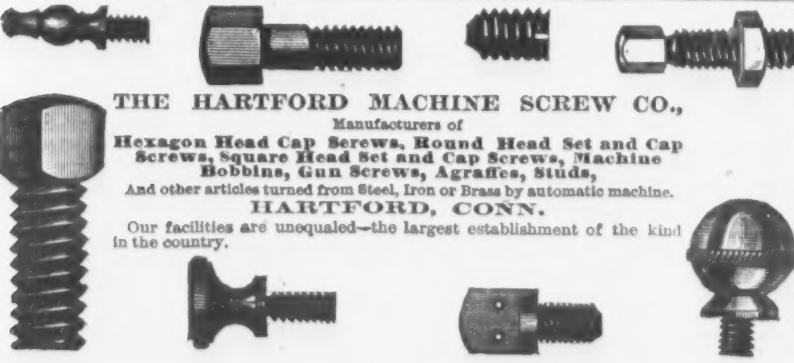
The Blako Crusher Patent has expired. After six years of practical and constant use at the Etna Iron and Nail Works, Bridgeport, Conn., which Company all their information are respectfully referred, the former Crusher has demonstrated its superiority, requires but one-third the power to run, and requires less than one-half the expense to keep it in repair. It is the simplest machine ever made to accomplish the same amount of work. The saving in steam to run it, and the saving in expense of keeping in repair will pay for it in one year, besides saving all the annoyance and expense of delays. It will break rocks or iron ore as easily as a hand mill, and can do the same amount of work with one-third the power, as a three inch belt is thirty tons iron ore in ten hours. Larger machines in proportion. Every machine is made to stand as to efficiency, material and workmanship. We furnish of any required size—large or small. Its lightness and efficiency make it very desirable for gold and silver mining, all the parts being easily transported. We annex the testimony of a well known and experienced practitioner and manager.

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LEWIS JONES, Manager Etna Iron and Nail Co.

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TOTTEN & CO., Rolling Mill and Heavy Machinery Founders, Pittsburgh, Pa.



THE HARTFORD MACHINE SCREW CO.,

Manufacturers of

Hexagon Head Cap Screws, Round Head Set and Cap Screws, Square Head Set and Cap Screws, Machine Bobbins, Gun Screws, Agaraffes, Studs, And other articles turned from Steel, Iron or Brass by automatic machine.

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Our facilities are unequalled—the largest establishment of the kind in the country.

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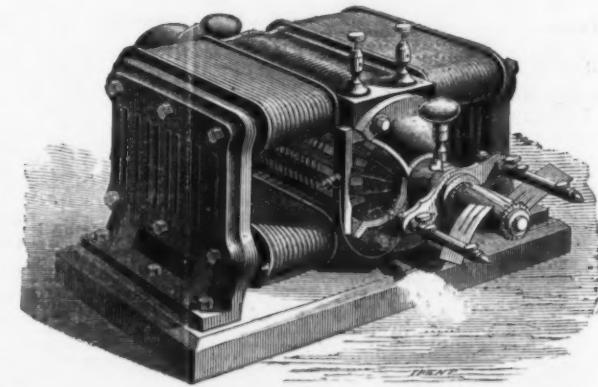
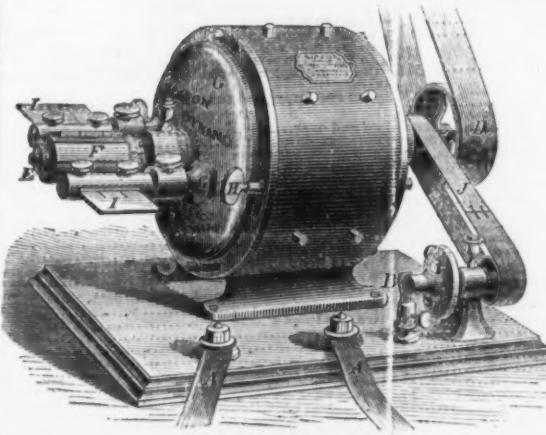
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THE MOST POWERFUL, SIMPLE AND COMPACT ELECTRIC LIGHT MACHINE IN THE WORLD.

By actual tests this machine has been found to yield more than double the amount of light per horse-power obtained from the best machines built in this country.

Please send full particulars regarding buildings or localities to be lighted, available power, &c.

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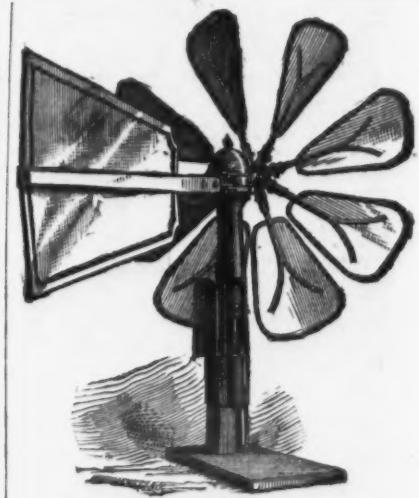
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Water Driven to any Height and Distance
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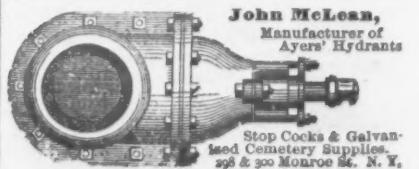
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Bar and screw of cast steel, with two extra cutter heads. Manufactured and for sale by the

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For Round, Flat or Square Iron,

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HYDRAULIC JACKS,

To raise from 2 to 120 tons.

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For special and general use.

HYDRAULIC HAND & POWER PRESSES

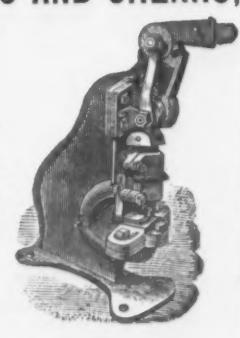
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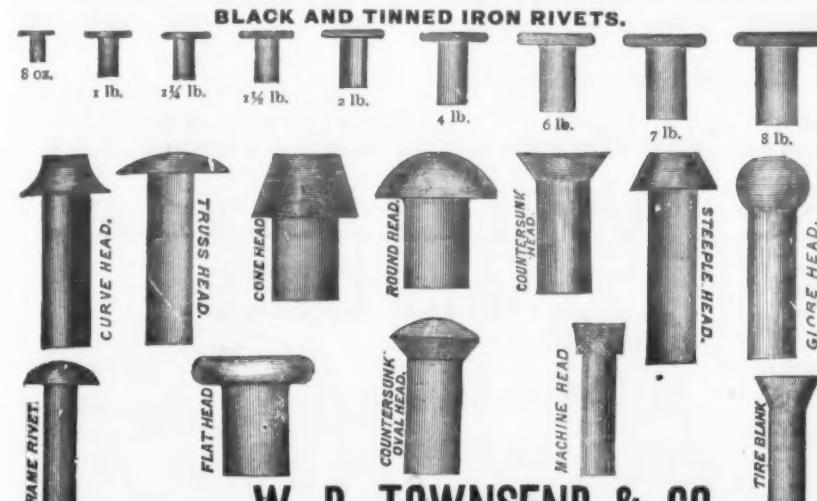
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COACH SCREWS,
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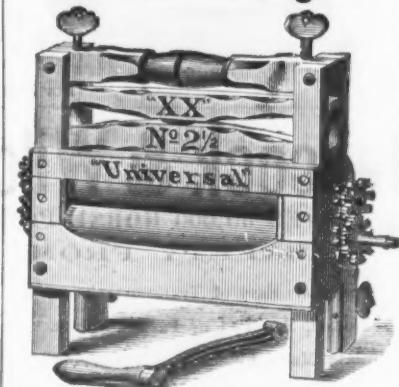
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Sole manufacturer of the above Screw. Indorsed by builders, railroad and mining men as the best screw jack in the market. Also manufactures Press Screws, Lard and Wine Presses, Tackle Blocks, &c. Circulars and prices, address as above. (Please say The Iron Age.)

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Over 500,000 sold!

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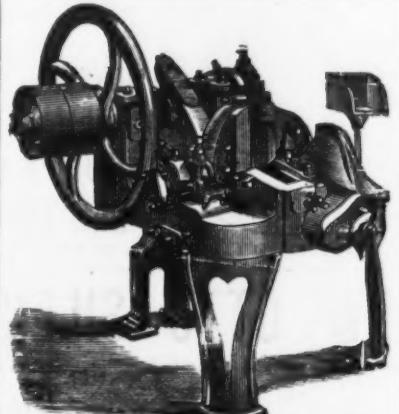
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Be sure and inquire for the "Universal."

Sold by the Principal Jobbers in Hardware and House-Furnishing Goods everywhere.

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Manufacturers of Nail and Spike Machines, Bolts, Nuts, Washers, Rivets, &c. Castings, Forgings and Blacksmith Work promptly attended to.

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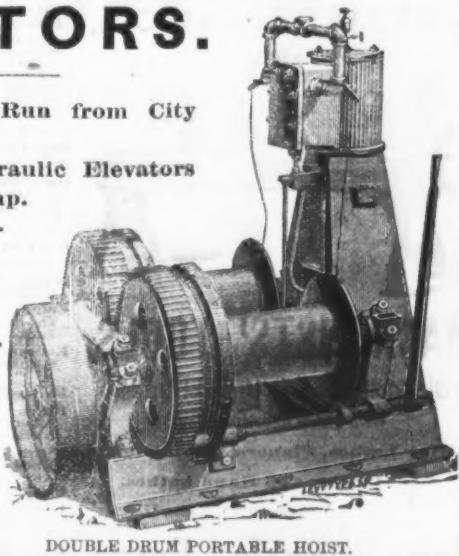
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Send for circular to
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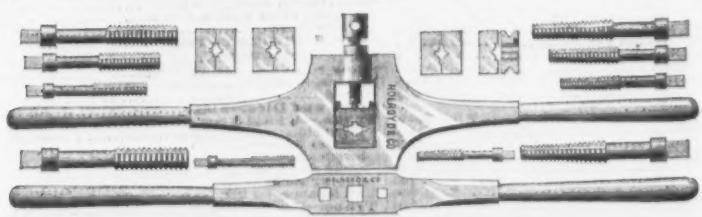
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No. 0 threads	$\frac{1}{4}$	to	$\frac{3}{8}$	inch.
No. 1 "	$\frac{3}{8}$	to	$1\frac{1}{8}$	"
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THE STOCKWELL SCREW & MACHINE CO.,
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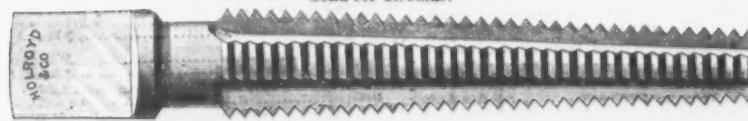
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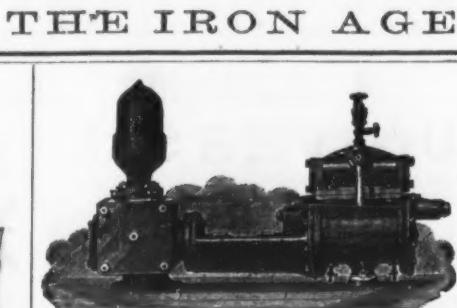


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"SPECIAL" STEAM PUMP

Is the Standard of Excellence at Home and Abroad.

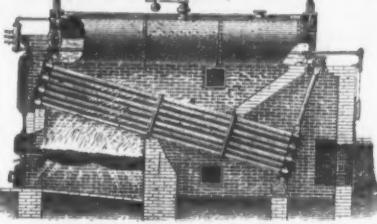
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OVER 50,000 HORSE-POWER NOW IN USE. ADAPTED FOR ALL PURPOSES.

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In Sections Easy of Transportation.
No Bolted, Screwed or Packed Joints.
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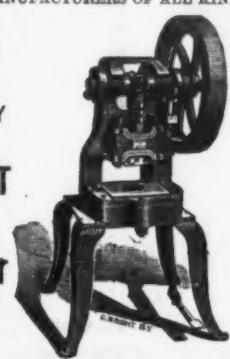
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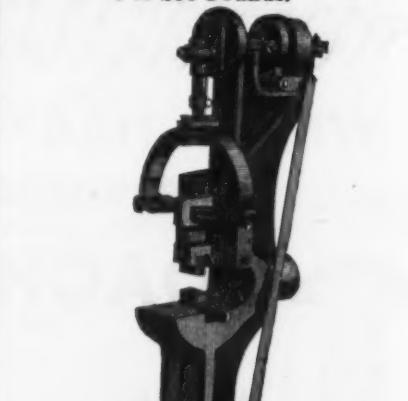
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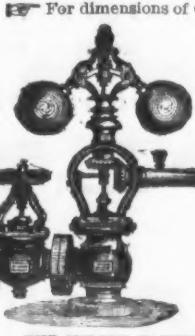
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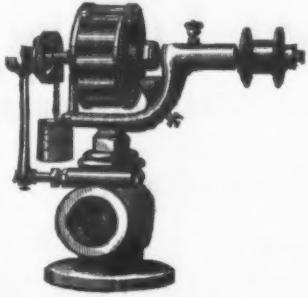
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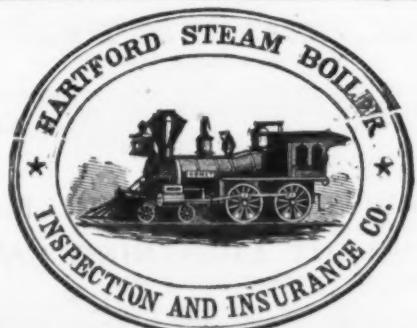


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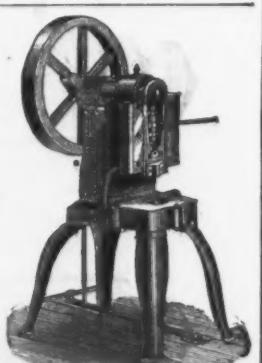
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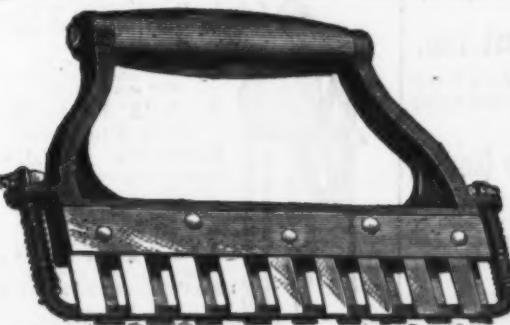
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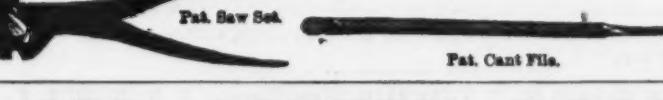
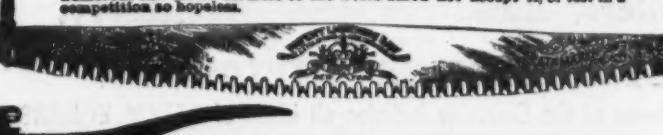


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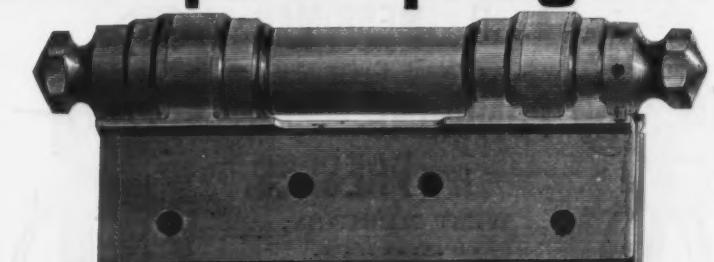
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